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The AUTOMOBILE

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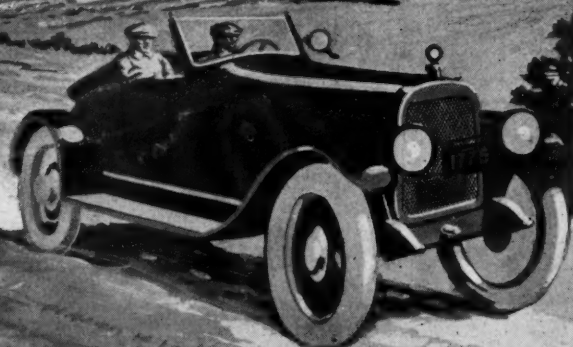
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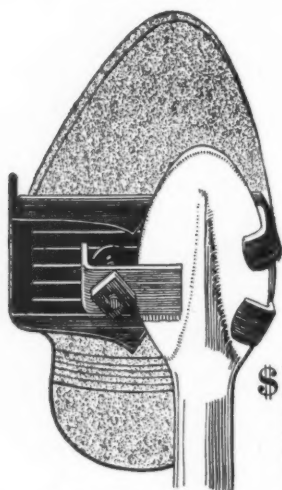
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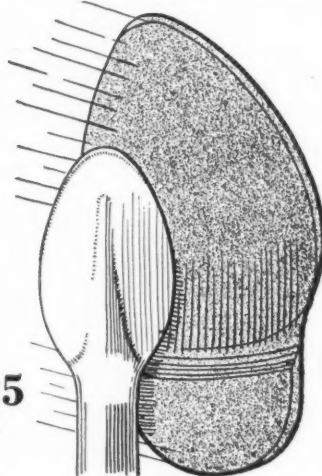


Look at These Illustrations

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Foot
Cannot Slip



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Set



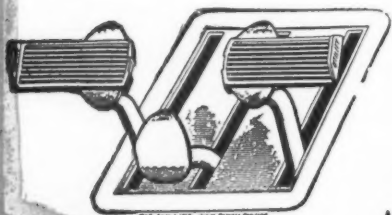
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Wreck Your
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AUTOMOTIVE INDUSTRIES

The AUTOMOBILE

VOL. XLI

NEW YORK—THURSDAY, AUGUST 7, 1919—CHICAGO

No. 6

How the German Trucks Were Surrendered to U. S. Army

IF any one American to-day knows about the trucks that kept the German army equipped for fighting during the four and a half years of war, that man is Lt. Col. Arthur J. Slade, an automotive engineer who became chief of the Motor Transport of the A. E. F., then served on the Armistice Commission and was appointed to receive the motor equipment surrendered to the American Army. In receiving and cataloguing this equipment, Col. Slade made a study of the vehicles, and the results of this study are to be given to the readers of *AUTOMOTIVE INDUSTRIES* in a series of articles, of which this is the first.

By Lt. Col. Arthur J. Slade

WHEN Marshal Foch, as commander-in-chief of the Allied Armies on the western front, presented to the German delegation the conditions under which the armistice would be granted, he included in these conditions the delivery of a sufficient number of motor trucks to render the motor transport of the German Army ineffective should hostilities later be resumed.

The fact that only 5,000 trucks were demanded occasioned some surprise, as it seemed unlikely that the delivery of such a small number of vehicles in comparison with the much greater numbers used by the Allied Armies would cripple the German transport service. But it was not generally realized to what extent that service had deteriorated.

The German delegates to the Permanent International



A group of trucks on the road test



Photograph made on the hill test course



Light snows stopped the hill tests because the steel tires skidded



A portion of the men who made the road tests

Armistice Commission at Spa repeatedly made the statement that, at the time of the signing of the Armistice, there were not more than 9,000 trucks in the German armies on the Western front.

Literally thousands of trucks had been abandoned on the lines of evacuation, due to breakdown or lack of fuel, and this trail of the retreating armies was to be observed on all the principal roads across Belgium and Northern France, Luxemburg, Alsace and the German Rhine provinces.

Marshal Foch later granted an extension of time for the delivery of the 5,000 trucks in order to permit the use of these vehicles in the evacuation and retreat and it was not therefore until the German Armies had withdrawn across the Rhine beyond the neutral zone and the Allied Armies were in occupation of the Rhine bridgeheads that the delivery of the motor transport equipment was begun.

It is not improbable that many motor vehicles were appropriated by the civil populations in localities where the troops disbanded after their retreat and numerous cases were reported of the sale of such equipment by German soldiers to individuals. It is therefore not surprising that the German officials experienced difficulty in collecting enough trucks in serviceable condition, and with their military equipment, to make up the prescribed quota; and before the deliveries could be completed they were compelled to procure new trucks from the factories, numbering probably several hundred.

It may be questioned whether the vehicles finally delivered fairly represented the standards of the German army transport. It is believed that they do, because several complete truck companies were turned in for inspection and acceptance in the condition in which they were being used in service, and the vehicles in these companies were of the same makes and types as those delivered from overhaul shops, parks or factories. Vehicles captured, or abandoned, in the American sectors were also of similar types.

During the latter portion of the period in which the trucks were being delivered to the detachment of officers and mechanics organized for the inspection and acceptance of armistice vehicles in the zone of the U. S. Army of Occupation, a collection was made of all available makes and types of motor vehicles and has been brought to the United States and placed in the Motor Transport Corps shops at Camp Holabird, Baltimore, Md., where systematic research and test are being carried on, the results of which will be published upon completion.

The collection consists of 47 trucks of different makes or models, three eight-passenger car chassis and a number of spare parts and units. It is contemplated that the collection will be added to by

subsequent shipments of German parts and samples of military vehicles used by the armies of our allies which will be similarly analyzed.

Perhaps the most interesting fact in connection with these military trucks is that they are substantially commercial models, largely of pre-war types, with military bodies, cabs and equipment, and incorporating only such modifications in chassis design and construction as seems to have been made necessary by military exigencies and lack of certain materials.

Several makes, delivered in the greatest numbers, had previous to the war been imported into the United States, including the Benz-Gaggenau, Büssing and Daimler, and there is no evidence that any attempt had been made, much less put into execution, toward standardization of design or interchangeability of parts and units. The idea seems to have been to keep their factories in production on their commercial models and to use the facilities of these factories for reconstruction work.

The changes incorporated during the war were necessitated, in the main, by the lack of rubber, lubricating oil and gasoline, and consisted principally of substitution of steel tire bands on wooden blocking in place of rubber tires, reduced vehicle speed through increased drive gear reduction, supplementary spring suspensions, lubrication heating and carbureter nozzle variation.

Subsequent articles will deal with details of design, while this article will confine itself to the general characteristics of the vehicles and the German methods of operation and maintenance.

The accompanying photos showing a group of trucks on road test near Coblenz preliminary to including them in the collection shipped to the United States, and a portion of the collection at the railroad yards awaiting loading indicate the superficial similarity in type, all being driven by the rear wheels, having bodies of uniform arrangement, well enclosed permanently fixed drivers' cabs, engine under hood and right hand steer and control.

The cargo bodies vary only slightly in their general dimensions, conforming rather closely in floor space to those used by the Allied Armies (the variations being due to differences in chassis dimensions), and the height of the sides approximates that of the British truck bodies, being about a foot higher than the U. S. Q. M. bodies. The construction is much lighter and they have hinged sides and tail gates, the floors in many instances being dished so that the load tends to pack toward the center.

There is no distinction made between ammunition and supply bodies. This is in accord with the practice of the Allied Armies, though at variance with the present U. S. Army practice.



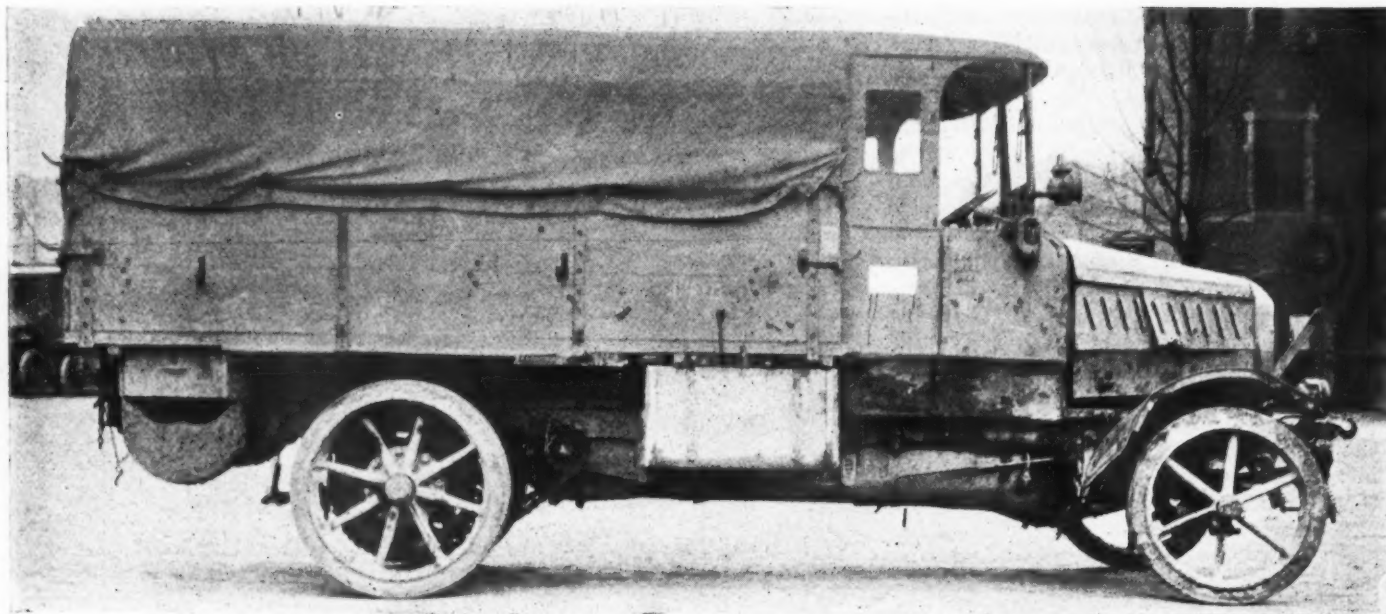
Trucks lined up for loading for shipment to port



Note comparative size of truck and freight car



Ready to start for America



The Mulag looks very long

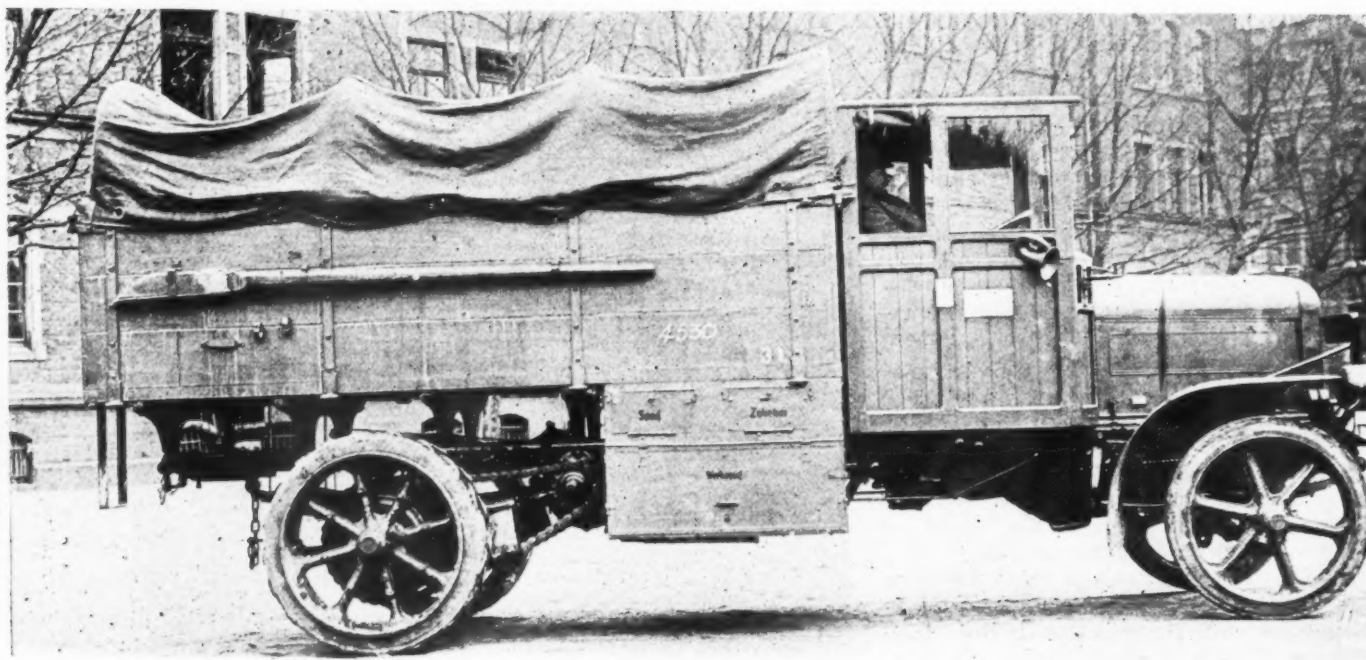


As you meet a Hansa Lloyd

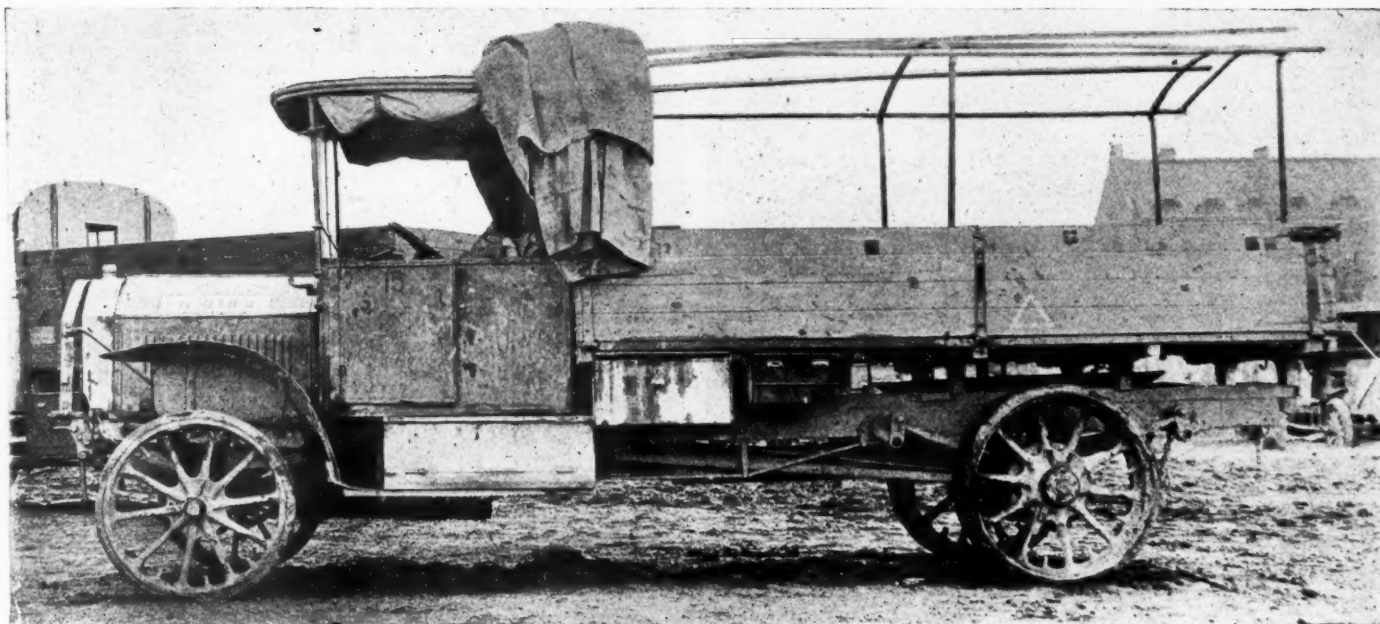
The cabs are all enclosed, with seats the full width of body, and have fixed tops with glass windshields and either side windows or curtains. The comfort of these drivers' compartments is favorably commented on by American drivers, and is in marked contrast to the lack of protection and comfort provided on most U. S. Army vehicles.

While the accessory controls provided seem unnecessarily numerous in some instances, including, as they do, operating mechanisms for sprays, water cocks for brake cooling, oil feed adjustments, etc., they are conveniently located and, in a spacious, well enclosed cab, are not as objectionable as if they were installed in connection with a driver's seat protected only by a folding top and a storm apron.

The engine location under hood is of course quite conventional and the right hand steer and control is general European practice. There may be some argument in favor of the latter when it is considered that most of



The Adler ready for the road

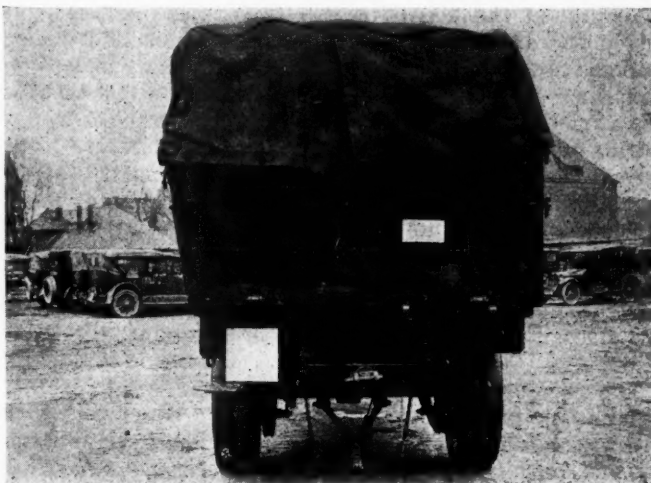


Light wheels feature the Benz

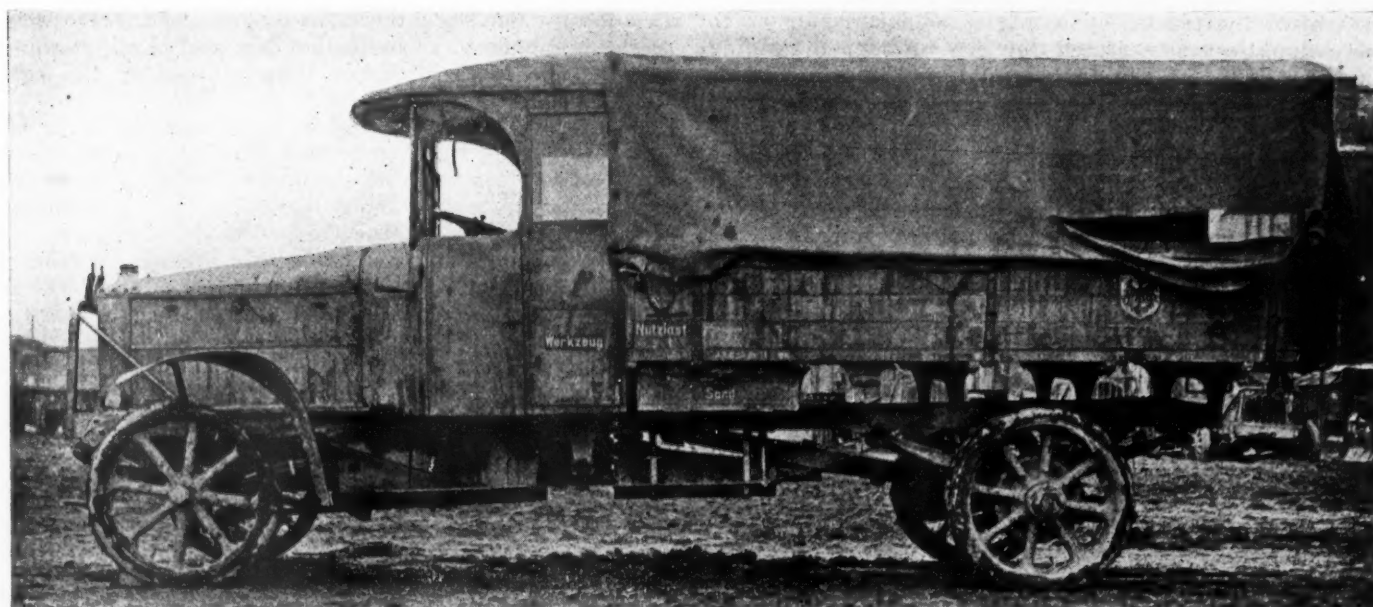
the roads in the combat areas were narrow, with ditches at the sides, and the American trucks with left hand steer were frequently slipping off into the latter. This was particularly the case with trucks steering by the rear as well as the front wheels. The German trucks are easy and convenient to operate, including the steering and gear shifting, and the weight distribution is conventional.

The collection of trucks was made during the winter months and the vehicles, being parked out of doors, were continuously exposed to the elements. The lubricant used by the Germans was not a lubricating oil but a synthetic compound, possibly of a vegetable or animal base, and when cold became congealed, though when heated becoming fluid. As a result there was much difficulty in getting the oil lines cleared and the engines started and, during freezing weather, it was usually necessary to resort to towing instead of hand cranking.

It was reported that, when possible, the German driv-



A Daimler starting for the hill test



The cab on the Bussing looks very comfortable



Steel tire shrunk on wood rim

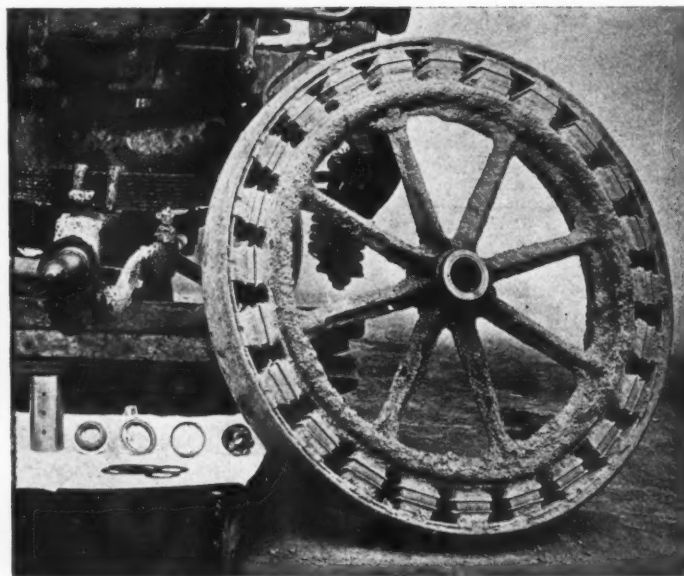
ers were required to drain out the lubricant when hot and fluid at the end of a run and reheat before again filling for another run. When the engines had become warmed up and the lubricant was flowing freely, they generally ran smoothly. When making road tests of the various makes of trucks in order to insure the selection of a serviceable and fairly representative example of each model for the collection, American lubricating oil was substituted for the German lubricant and it was occasionally found that the oil leaked past the pistons, fouling the spark plugs. This may have been due to wear of the cylinder walls, or an increased clearance may have been made necessary when the shortage of oil necessitated the substitution of the synthetic lubricant.

The fuel used by the Germans, as the result of their gasoline shortage, was supposed to be a benzine mixture with alcohol distilled from potatoes. The aviation service, of course, had priority on the best gasoline as in the case also of the Allied Armies, and the motor transport was therefore forced to the use of a substitute.

Different sizes of carbureter nozzles were found in several of the trucks' spare parts compartments, which were doubtless substituted for one another depending on the quality of the fuel available. This low grade fuel was a cause of difficulty in getting the engines started.

Several hundred trucks were issued to engineer organizations engaged on road or other construction work and no difficulty in connection with their operation was reported. It was, of course, impossible to operate those having smooth steel tires when there was mud or snow on the road surfaces, even those having cleats on the tire bands being unsafe to operate under such conditions, but under favorable road conditions they operated very nicely.

As the weather and road conditions were anything but favorable at all times and places where the German transport had to operate, the service must have been very seriously handicapped. In fact, it was stated by German officers that at no time during the war were steel tired vehicles run during the winter months on the Russian front and that steel tired vehicles can be considered only 20 per cent efficient as compared with rubber tired trucks. It was further stated that there was quite a considerable amount of insanity among the



Steel tire cushioned with rubber set in cups

drivers as a result of the difficulties of operation, although it was the practice to place three men on each vehicle.

The photos of the N. A. G. built by the Nationale Automobile Gesellschaft of Berlin, one of the makes reported to be much favored by the operating personnel of the German transport service, and the Benz, built at Mannheim, another make extensively used, indicate the provision made for carrying spare parts, tools, chains, and other equipment on each individual vehicle, a special feature being made of having every vehicle fully supplied with the necessary equipment for its successful operation and the minor spare parts for road repair or replacement.

Each train of 25 trucks carried a machine shop truck with skilled mechanics capable of making replacements on the road, using the parts carried with each vehicle or making new parts or repairs to damaged parts in the portable machine shop. The replacement of complete units was not general. The observations of one of the American acceptance officers was that similar parts, such as cylinder blocks, for example, were not interchangeable on different trucks of the same model, and therefore repairs were made to an individual damaged part, retaining same on the vehicle rather than attempting the substitution of a new part.

This policy was confirmed by a German technical officer attached to the Armistice Commission, who voiced a protest against what he considered to be an excessive demand on the part of the Allied delegates for complete sets of spare units for the various models delivered.

The general and detailed chassis designs do not readily permit removal and replacement of units with any degree of convenience, and there is no indication that quantity production and assembly methods have been in vogue in the German motor vehicle industry.

(To be continued)

Britain Sells Aircraft Lining

THE British Disposal Board has disposed of 43,000,000 yd. of aircraft lining at 1s. 8d. per yard. The sale was made to a private party after negotiations with the linen manufacturers of Belfast had failed. The linen cost the British War Department 1s. 3d. to 1s. 4d. per yard.

Originality in Design Shown in New British Tractors

Royal Agricultural Society Exhibit, resumed after war suspension, is notable for the number of farm power plants; 371 stands in the farm implement section. Nine American tractors attract much attention. British machines present many novelties, most of them burning kerosene. The Glasgow, featuring a three-wheel drive, arouses much curiosity

LONDON, July 7.

AFTER being suspended, because of the war, for two years, the 78th Annual Show of the Royal Agricultural Society of England was held June 24 and 28 at Cardiff. The show is the most important event of interest to British makers and users of farm implements, and is held in the open air. This year it covered 110 acres, and the implement section numbered 371 stands. The greatest interest centered in the phenomenally large display of motor trucks and farm tractors, and to a less extent in the self-lifting plows and the cultivators, manure spreaders, reapers and harvesters. One combined tractor-drawn harvester and motor-driven binder was shown.

A notable advance in the number of British tractors was observed, at least four of those shown being new types, and one, the "Glasgow," was unique in design and construction. In the following the British tractors are briefly reviewed:

The Alldays is an all-purpose machine, *i.e.*, intended for hauling on both land and road.

The Austin largely resembles the Fordson, but has a longer wheelbase and a much larger belt pulley than is usually fitted to tractors. This has been described and illustrated in AUTOMOTIVE INDUSTRIES.

The Saunderson and the Omnitractor have two cylinder vertical large-bore engines across the center of the frame, and the Omnitractor has a hand-power actuated mechanical engine starter.

The Clayton and Blackstone are of the chain-track type, and the Blackstone engine is reversible by compressed air.

The Victoria is an oil-engine with cable and double-ended tilted plow for hauling to and fro across a field.

The Fowler, Crawley and Martin are three convertible tractor plows, the two former being wheel-type and the latter a chain-track machine. The Santler, with a two-cylinder, vertical engine and two-speed gear, is a one-way combined tractor plow, with reversible sets of bottoms.

In steam tractors there were shown the Mann, McLaren and Garrett & Summerscales machines. The Mann, McLaren and Garrett have a locomotive boiler and a slide-valve reversing gear, two cylinders above the boiler, saddle-fashion, but the Summerscales has a four-cylinder, V-type, single-acting, all-enclosed poppet-valve engine, and a vertical tubular boiler, reversing being by a sliding camshaft.

American Tractors

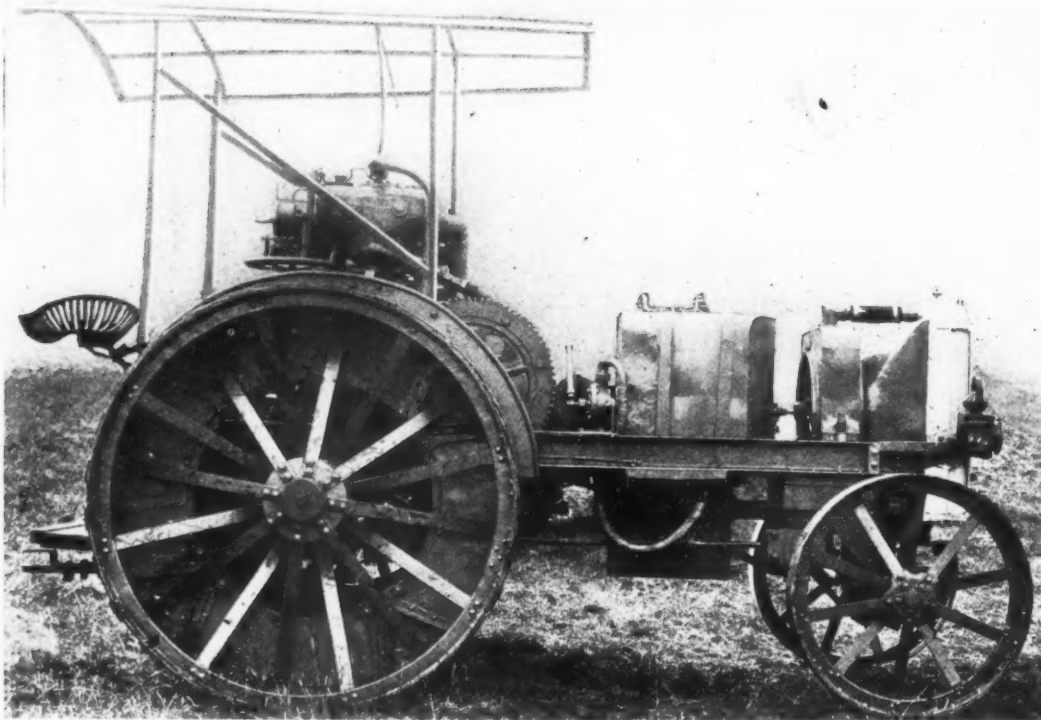
American tractors were represented by the Overtime, Moline, Cleveland, Garner (this is a British name for an imported tractor), Wallace Cub Junior, the I. H. C., Mogul and Titan, and the Fordson.

The International Harvester Co.'s exhibit was one of the largest and most attractive to farmers at the show, and was much more important than any other as regards the variety of special tractor implements displayed. The new Moline tractor, with vertical four-cylinder engine and electric generator and starter, and refinement of the controls, attracted much interest among the visitors.

Like almost all the engined exhibits it was demonstrated in motion, which enabled it to demonstrate its ease of



Glasgow three-wheel tractor. The three wheels are power driven, the front ones being furnished with over-running clutches for steering purposes



The Omnitraction with two-cylinder vertical engine

starting and ability to be turned (using the new differential control) in practically its own length.

The Wallace Cub Junior attracted interest because of its being one of the best known tractors on this side, and because it uses water as a constituent with kerosene. It was shown running on a percentage of 65 of water to 35 of kerosene, and it was one of the sweetest (*i.e.*, least odorous and smokeless) tractors on the ground, an indication that the combustion was complete. This tractor is to be built in England by the Ruston-Hornsby Co. for the British and Colonial markets. Mr. Turner-Smith, the managing director, is in America arranging the final details of the program.

English Tractors

Appended are a few particulars of the novel British tractors—the Clayton, Blackstone and Glasgow. A feature of the British tractors is that most of them are built specially for kerosene and have only medium-speed engines.

The "Clayton" chain-track tractor has a four-cylinder vertical engine by the Dorman Co., of Stafford, a specialist engine building company. It develops 35 hp. at 1200 r.p.m. and 16 hp. at the drawbar. The belt pulley is at the rear on an extended fore and aft shaft. The drive is through a cone-clutch controlled by a pedal on the driver's left. There are two speeds forward and a reverse, in both cases by indirect gearing enclosed in an oil-tight casing. Steering is by a wheel and sector, which operates (in and out of engagement) a pair of cone-clutches by which the drive is transmitted to the respective chain belts.

There are, besides, a pair of band brakes on the peripheries of the cone-drums. These are independently applied by a right and left pair of pedals, so that the tractor may be steered by hand or by its own power acting through the pedal brakes, the latter being usually used only for correcting any tendency to side-track. The main frame appears to be of cast steel members of hollow rectangular section, the track-belt supports and carriers being of wrought metal and, so far as we could see, all of them readily repairable or easily matched at a country forge.

There is a divided drum-tank on either side of the bonnet, the smaller compartment holding gasoline for starting, and the larger one the main fuel supply. There is a smaller drum-tank transversely at the back of the bonnet casing, which carries oil for lubricating the respective track-belts by separate pipes with a stop-cock for each.

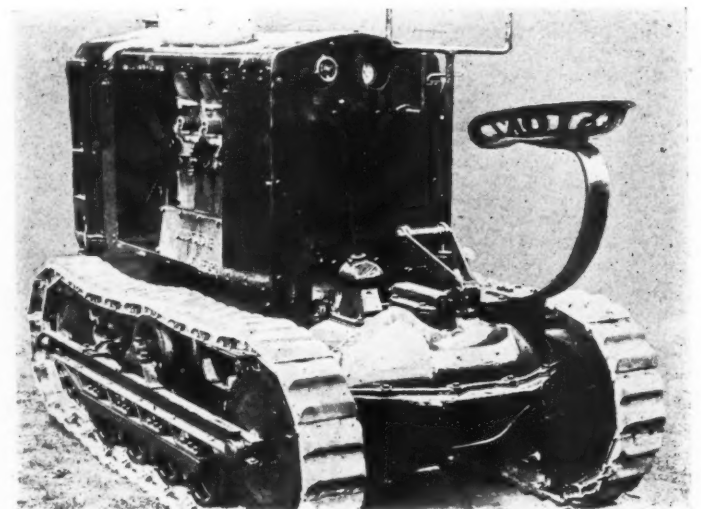
The fuel consumption averages under 5 gal. of kerosene per acre, and the working capacity per 8-hr. day averages 6 acres on light land and 4 acres on stiff land, using a four-furrow Ransome (British) or Hamilton (Canadian) gang-plow. The gross weight is under 3 tons, and the weight per unit of tractor-belt surface in contact with the ground is 1 lb. per square inch.

The track-belt links are made of solid-stamped

chill steel and are readily renewable.

The Blackstone tractor with reversible engine is made by Blackstone & Co., Ltd., Stamford, Lincs., manufacturers of a series of oil engines. At present it is of the chain-track form, but probably it will be available alternatively in the four-wheel type. It has a three-cylinder vertical engine with a bore and stroke of 5 in. by 6½ in. and develops 25 hp. at 750 r.p.m. It is directly reversible by a sliding-cam mechanism and compressed air, from a storage tank kept charged by a pump on the engine. It has two ranges of speed for both the bore and aft drives, and, being reversible, has no reversing gear. Its consumption of kerosene under load is at the rate of 0.5 pint (British) per brake-horsepower hour, and it can haul a 3-4 furrow plow.

The "Glasgow" tractor is made by the D. L. Motor Mfg. Co., Ltd., of Motherwell, near Glasgow. It received much attention, and having a three-wheel drive, seemed to



Blackstone chain-belt tractor, with a three-cylinder vertical engine that can be started from cold on kerosene (saturated fuel air injector) and reversed by compressed air

puzzle some, not so much as regards the drive, as in respect of the free-wheeling necessary when turning. The way this combination of all-wheel drive and freedom of the steering lay-out has been worked out is neat, and if the internal details are as robust as the spherical knuckles and drive-shaft members (the only exposed details by which one could judge), much of the criticism which usually attaches to a front-wheel drive cannot apply in this instance.

The machine, with its cast disc wheels and somewhat slender proportions, is of novel form and suggests a maximum of tractive effort and wheel-grip for a light tare (3600 lb. gross). If it stands up to the tests common in ordinary usage, there should be a big scope for it on farm lands of the size and general character met with in Great Britain.

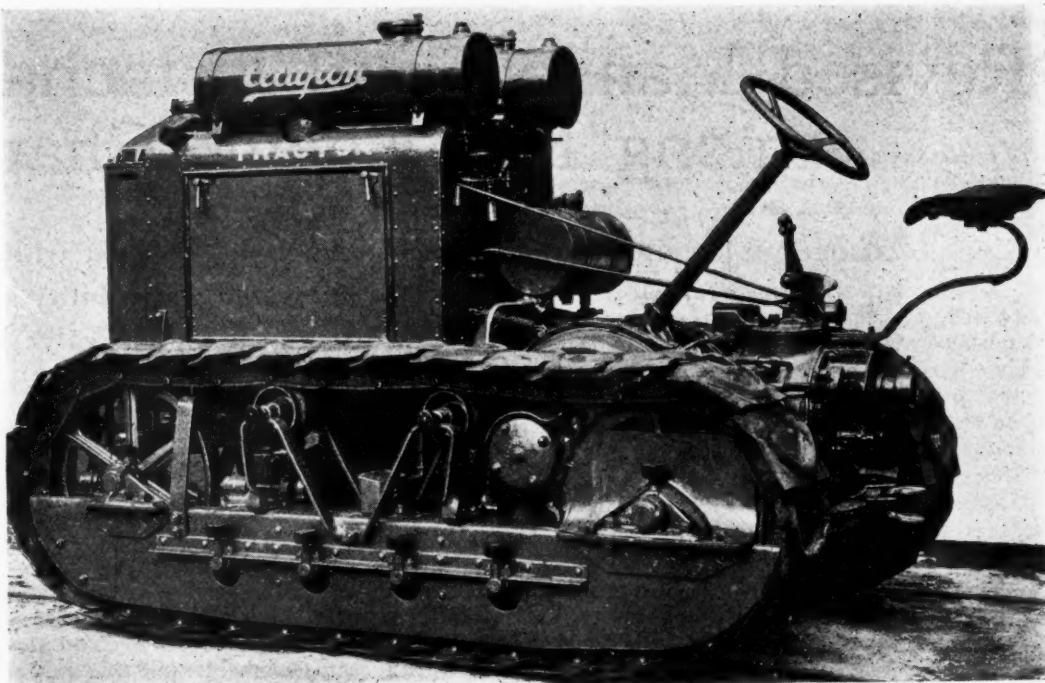
British highway laws require that a tractor or other road locomotive if used on public roads must have a pair of independent-acting brakes, each capable independently of holding it on an average gradient. Hardly any imported tractor has complied with this requirement, and the Fordson, being no exception, has to be specially equipped in this respect. Accordingly, a British firm has introduced a special braking attachment for this tractor, and a sample of it was shown alongside the new special Ford belt-pulley attachment. The Fordson importer here has been without the belt complement to the complete tractor.

The present price of the Fordson in Great Britain is £280 (\$1,400), and about £12 (\$60) for the belt attachment, so that when the machine is fully equipped there is little difference in favor of its cost as compared with the British Austin at £300 (\$1,500). This estimate does not include the brake referred to for road use.

The British public seems to have lost interest in Ford car tractor conversion sets, only one being seen at the show. The result seems to have been exactly what was anticipated, the attachment and the load proving too much for the Ford chassis. Moreover, as the cost of these attachments ranged from £50 to £90 (\$250-\$450), this added to the present average price of second-hand Ford cars (\$725), makes the total cost of the combination \$1,175, which is only \$325 less than the price of the British Austin and \$225 less than the Fordson at its present enhanced price in the British market.

There was a good display of steam traction engines, both in the large and small classes (the latter being somewhat misleadingly styled "tractors" in Great Britain), but as neither class interests American readers, it need only be added that in Great Britain steam locomotives are not much used on the land, though there is a big use of steam stationary cable-fitted locomotives, and probably the bulk of the plowing is still done by this class of plant, and certainly it seems the cheapest form of plowing and cultivating on a big scale.

There was a good display of "Hand Man" and similar engines, almost all of these being of the hopper-cooled type on portable frames. The American contingent, which was



The Clayton tank-belt tractor; weight about 6500 lb.

the pioneer of the hopper-jacket type, was largely represented, and seem still to have the monopoly in price. The cheapest British engine was of 3 hp., and was listed at £40 (\$200). Before the war an excellent engine with inverted-vertical single-cylinder, of 3 to 5 hp., of British make, could have been bought for \$125-\$150. Not many years ago there was a correspondingly big display of small steam engines and boilers at these shows at Cardiff, and there was not a single oil or gasoline engine of the sort described. Now the condition is quite reversed and steam plants seem dead for the power plant.

There has always been a fair display of electric lighting and pumping oil engines at these shows, but they have been of the larger and more costly sort, unsuited for farmers. We noticed a few small sets this year, apparently the outcome of the war-time call for small camp-lighting plant. American makers of this sort of plant should see that their London branches get a sample or two of these sets.

The Delco self-governing plant of this type was shown by the agents for the Cadillac car, both as a self-contained gasoline-electric lighting set and as a gasoline pumping set, in both types self-governed by the load. The Hamworthy, with direct fuel injection, was the only new type British engine of the small type noticed.

ACCORDING to an article in *Forschungsarbeiten*, the "machining constant" (*Bearbeitbarkeit*) depends on the hardness and pliancy, and is measured by boring tests, according to the depth of hole made by 100 revolutions of a boring tool with a given pressure on the tool. The depth of hole is approximately proportional to the pressure. The comparison is made with reference to annealed electrolytic copper as a standard.

With brass test pieces, the machining constant rises quickly with up to 1 per cent addition of lead, and less slowly up to 12 per cent addition of lead. With cast iron, this constantly increases with addition of silicon, and is greatest in cast iron in which the largest quantity of the carbon content is deposited as graphite. With wrought iron the machining constant increases directly with the quantity of carbon present, and with the hardness, as measured by the Brinell test, and decreases inversely with the coefficient of extensibility.

Revised Manifold and Detachable Head Among Reo Engine Changes

Changes in keeping with advanced practice are effected without disturbing features peculiar to this motor. Increased accessibility solves a long standing problem and cover for the overhead intake valve makes for a cleaner design. Ring construction is a novelty. More liberal use of aluminum lessens total weight.

By J. Edward Schipper

A COMPLETE revision of the manifolding to provide greater vaporization of fuel, increased accessibility of the intake valve assembly, increased engine speed and a cleaner design are the result of changes made in the Reo engine for the 1920 model car.

While the power plant has been designed particularly for this model, it carries all of the earmarks of established Reo practice. The overhead intake valve with the side exhaust, used since 1908, is employed, but there is now a cover over the head which in connection with block cast cylinders (used for the first time) gives a much cleaner exterior. The method of holding down the valve cover by means of tension springs is notable. The engine is rated at 50 hp. at 2000 r.p.m., and has 3 3/16 x 5-in. cylinders.

Another innovation is the use of a detachable head. The entire intake valve assembly has been incorporated in the head, making a much more accessible layout than the previous types, where it was necessary to take off the cylinder casting to reach the intake valves. The cylinders and the upper half of the crankcase are cast together. The crankcase is split on the centerline of the main bearings, which makes for a simple machining operation and tends to lighten the engine, as a greater part of the case consists of aluminum. Aluminum is used extensively, particularly for all manifold headers, not subject to intense heat.

Lynite Pistons Continued

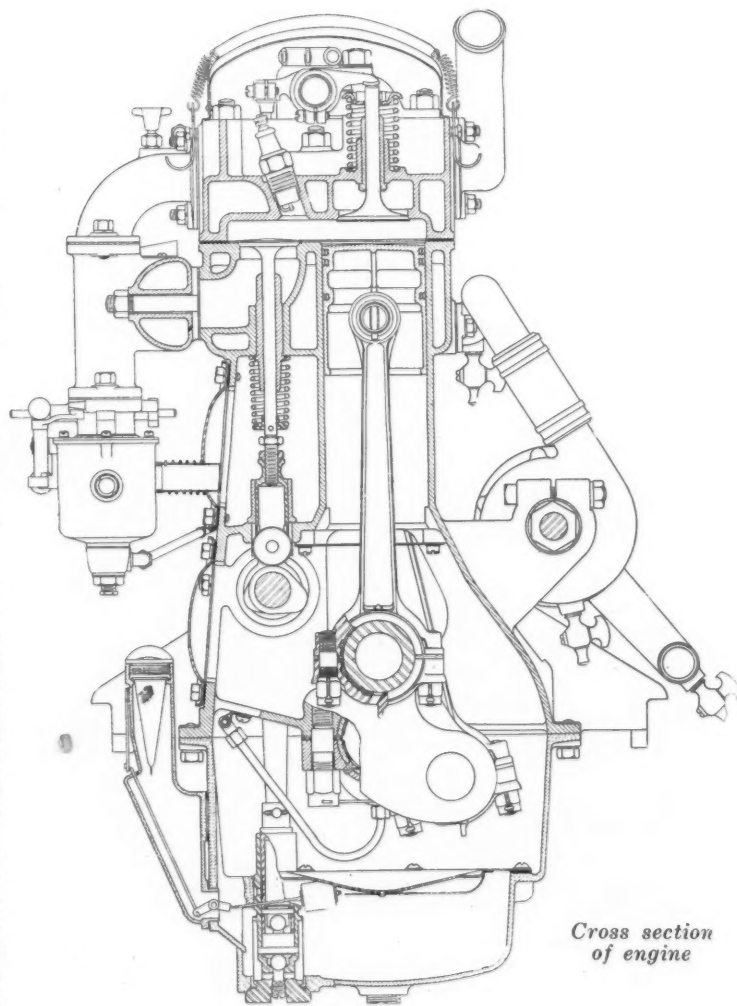
Lynite pistons have been used by this concern for three years and are continued in this model. These pistons have about the same proportions as a cast iron piston and weigh 15 oz. each, indicating sufficient metal for rapid heat transfer. There are three rings, all above the piston pin.

An interesting and efficient ring construction is used. Two eccentric rings are laid together to form one concentric ring and are pinned. They are then ground to size, and very accurately fitted, only 0.0025 in. clearance being allowed behind the ring. This is done to prevent the pumping action due to the opening and closing of the rings caused by the change in bore of the engine at different parts of the stroke after the engine has been in use for some time. The piston, which is 4 in. long, is relieved from a point above the center of the pin to the lower ring. The compression is about 56 lb. per sq. in. absolute.

On previous cars the piston pin was clamped in the rod, but in this model the bearing is in a bushing in the rod. A 10 1/2-in. I-beam connecting rod is used. This is of light weight, as it is machined all over and the web is brought close to the upper and lower ends. The light weight rods and general design of this engine make it by far the high-

est speed engine yet manufactured by Reo. The peak of the horsepower curve corresponds to 2750 r.p.m., as compared with 1800 to 2000 for previous designs. The rod caps are held on by two studs of electric furnace alloy steel, which also serve as dowels.

A 2 1/4-in. diameter crankshaft is used, mounted in four main bearings. These bearings are bronze-backed, detachable. The bearings in the lower end of the rod are die-cast by special machines. This gives an easily re-



Cross section
of engine

placeable main bearing and in the case of the rod it is a simple matter to take it out and rebabbitt it, or to slip in a new rod and return the old one to the factory, where the shop is not equipped to do the work. This gets away from fitting trouble and the misalignment which may result from inexperienced men undertaking to refit the rod bearing. The crankshaft is in inherent balance, and is a curved cheek type. Norton and Ackimoff machines are used for balance tests. In spite of its large diameter, the crankshaft is relatively light, as the throws are drilled. The new engine is a centerline type and not offset as in previous models.

Fabric gears with helically cut teeth furnish the timing and auxiliary drives. These gears have proven satisfactory in extended trials, the one precaution necessary being to take care of a 0.0025-in. expansion after cutting. The wearing qualities are said to equal those of steel of 0.35 to 0.40 carbon and the non-resonant qualities of the material are its chief advantages.

Four bearings also support the camshaft, which is $1\frac{1}{2}$ in. diameter and is forged with the cams integral. The large diameter of the shaft has made possible a cam contour with long dwell and well-rounded flanks. Roller followers are used, which is in line with this concern's former practice.

An extremely large intake valve area is provided, the inlet having a clear diameter of $2\frac{1}{4}$ in. This could hardly be equalled with any other valve arrangement. Effective cooling of the inlet valve stem is assured, and this permits graphite bronze bushings to be employed. The inlet valve has a lift of $\frac{9}{32}$ in. and is closed by a 50-lb. spring. The

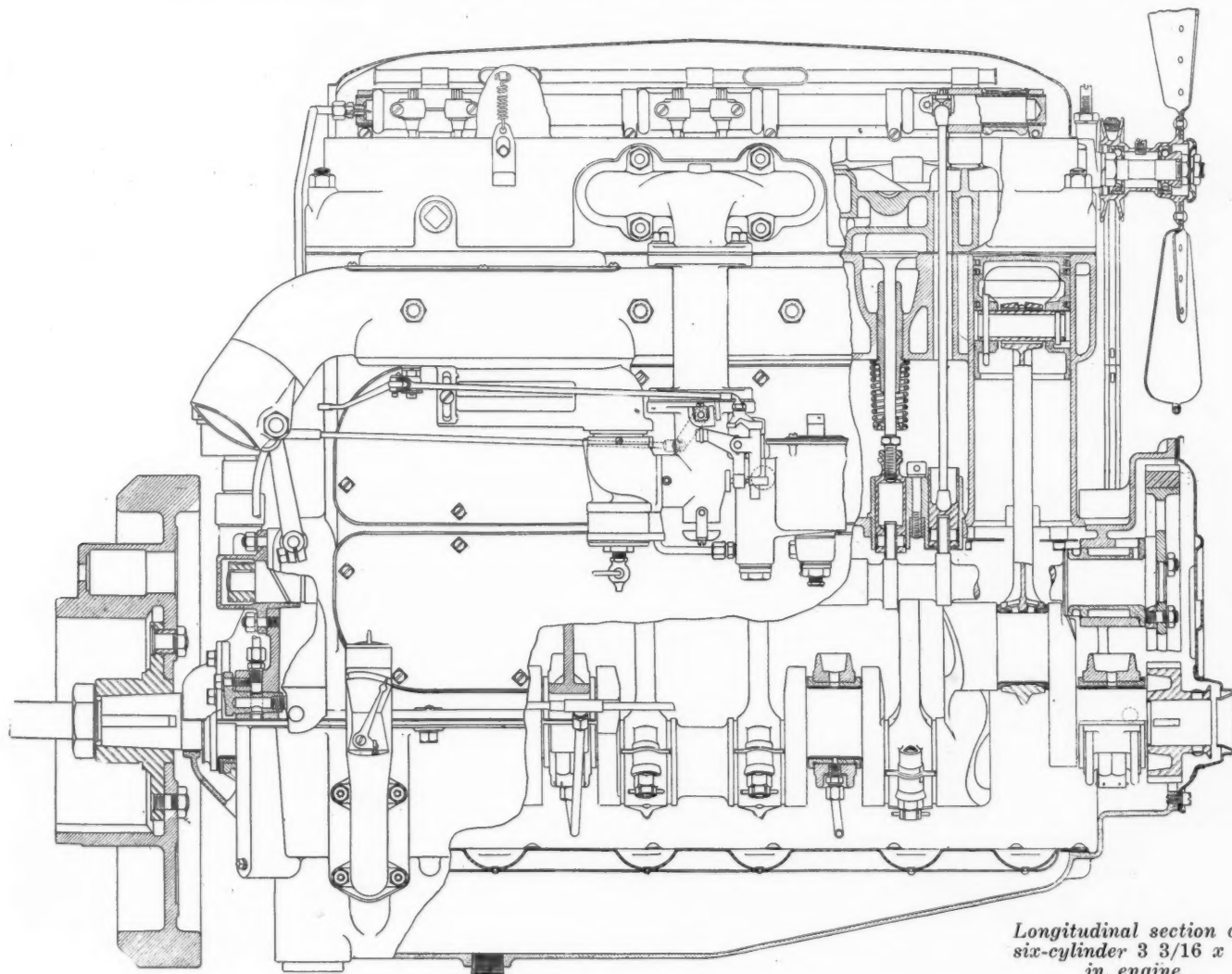
stem diameter is $\frac{7}{16}$ in. The exhaust valve has a clear diameter of $1\frac{3}{4}$ in. with a lift of $\frac{3}{8}$ in. and a stem diameter of $\frac{3}{8}$ in. The exhaust valve spring tension is 35 lb., closed. Cast iron is used for the exhaust valve guide bushing, the greater heat at this point rendering the graphite bronze impracticable.

The cooling water must pass between the exhaust valves on the way from the cylinder block to the detachable cylinder head. The water enters the cylinder block on the side opposite the exhaust valves, passes over to that side and between the valves up to the head, then back in the other direction past the intake valves to the outlet.

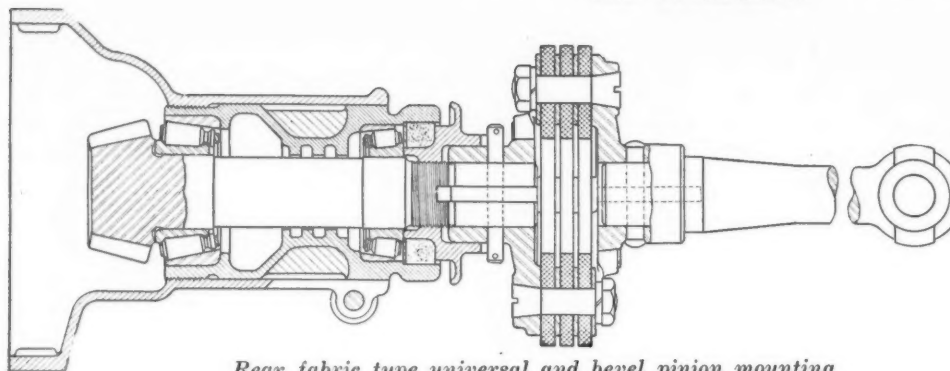
The spark plugs are inserted into the head on a slant, the objects sought in choosing the particular location being efficient cooling of the plug, protection from sooting and maximum power generation.

A complete revision has been made of the design of the manifold and particularly that part of the intake which assists in vaporization. The carburetor is now on the same side as the exhaust and a portion of the intake header is cast integral with the exhaust. This provides a means of heating the mixture just before it enters the manifold, which latter is contained in the cylinder head. Here the mixture is kept warm by the water surrounding it.

The intake air is also preheated in a more elaborate fashion than formerly. The exhaust manifold is split, providing what is known as a twin exhaust, with the front three cylinders exhausting into one part and the rear three into the other. Between these two exhaust pipes there is a slot through which the intake air can be drawn in cold weather. In hot weather, when this would provide too



Longitudinal section of
six-cylinder 3 3/16 x 5
in. engine



Rear fabric type universal and bevel pinion mounting

much heat, a damper is turned to draw in only cold air. This gives winter and summer settings for the air intake. If desired, the damper can be set in an intermediate position and some of the air drawn through the heated slot and some from the atmosphere. The primary air to the carburetor is drawn in from the crankcase. This air has a slight oil mist in it, which helps in lubrication and it is also believed to help in keeping the engine clean, as it supplants the breather.

The oiling may be readily recognized as Reo practice, although it has been refined in a number of ways. The single plunger pump is relied on to provide the pressure feed which takes care of the main bearings and also the overhead rocker shaft bearings. Scoops on the connecting rods provide lubrication for the lower rod bearings and the cylinder walls. The lower rod bearing bushing is drilled on an angle to provide a passage for the oil and in addition there is a cup formation over the top of the rod, which traps oil and allows it to reach the bearing.

Seamless steel tubing is used for the smaller shaft, and into this oil is fed from the plunger pump in the crankcase. Oil is fed to the bearing points in the rocker mechanism through a small hole regulated by a metering pin, giving the slow feed necessary. The excess oil drains back through passages provided. As the top of the engine is now covered, and this lubricating scheme is more complete than any before used, the quietness and durability of the engine has been enhanced. The oil pressure varies between 4 and 15 lb. in running. No pressure gage is used, but an exterior hand, which can be felt, acts as an oil level indicator. This method has been used since 1906. The crankcase holds 8 qts. and the gage shows "empty" when there are still 5 qts. in the case.

Northeast electric equipment is employed, the ignition unit being driven off the rear end of the camshaft. The generator is engine-driven in the usual manner, but the starting motor is mounted over the front end of the transmission, which is a separate unit located amidships. The starting motor drives through a chain and is connected by an automatic ratchet clutch when the pedal is depressed.

No change has been made in the dry disk clutch, which is held in engagement by three 60-lb. springs. The four-point suspension of the engine and the amidships position

of the separate-unit gearset necessitate a universal between the clutch and the gearbox. This is of the flexible disk type. The three-speed gearset also remains unaltered. The shafts are mounted on Hyatt rollers and the gears are $\frac{7}{8}$ in. face, case hardened. The gearset is mounted on a chassis subframe.

The rear axle is semi-floating, with a cast steel differential housing and drawn steel tubing over the axle shafts, which latter are of nickel steel, $1\frac{3}{4}$ in. diameter at the wheel bearing and tapering toward the center. The outer ends of the shafts are supported on Hyatt heavy duty type bearings. The pinion and drive shaft are integrally forged and a gear ratio of 4.6 to 1 is provided by a 12-tooth pinion and 56-tooth ring gear. The pinion and ring gear are spiral bevel with 5-pitch teeth. Timken bearings are used in the front axle, which is an I-beam forging with integral yokes.

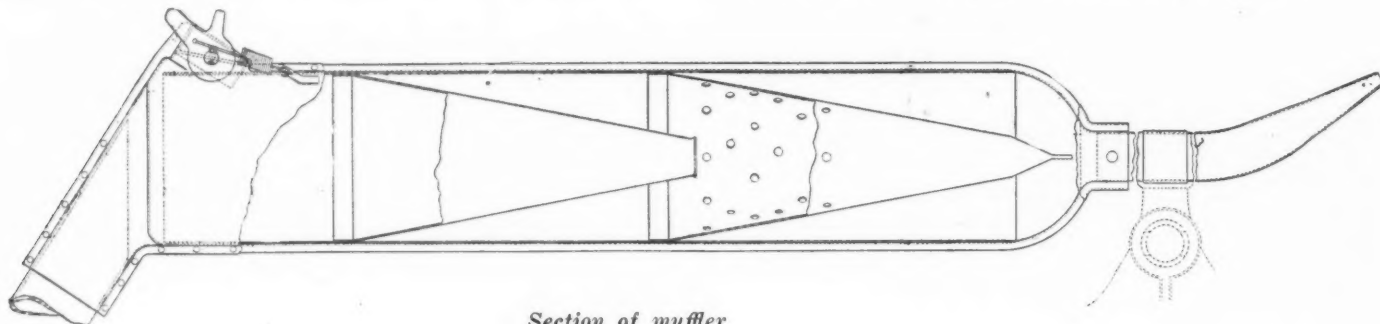
Hotchkiss Drive Employed

Hotchkiss drive is used, the torque and thrust being taken on semi-elliptic underslung rear springs, 54 in. by 2 in., with ten leaves. The rear end of the frame is dropped to form a low rear spring shackle support and give a flat spring. The brakes are on the rear wheels, but Reo adheres to the practice of interconnecting the clutch and brake. There are ratchets on both pedals so that either or both may be locked in position. The tire equipment is 33 by 4 in., Royal cord all around.

Gasoline is fed from the rear 18-gal. tank by Stewart vacuum feed to the Rayfield carburetor. The tank is hung between the rear ends of the frame side members and behind the tank is a special cross member construction to take the spare tire. This is in reality part of the frame and provides a bracket that could be used for towing.

Patent Protection in Germany

THE agitation, which was set on foot a few months ago to obtain an extension of the life of existing patents in Germany to cover the period of the war, gains in strength. The claim is being made, not only by inventors, but by licensees and technical and commercial societies. An influential deputation, representative of all these, has laid their case before the Ministry of Justice, urging its consideration. It is held that in times like the present investors should be encouraged, and the relations of industry disturbed as little as possible. To continue the rights of existing patents for an additional four years would be not only an act of justice to the inventors, but a steadying influence in the world of industrial development, a matter of vital importance in present conditions of things.



Section of muffler

Motorcycle Production Has Peculiar Problems

Methods of forming side-car panels and the electroplating installation are peculiar to this industry. Special fixtures and machine tools are designed by the producers to meet their peculiar problems. Each workman completely assembles the machine he takes charge of. Wheel assembly is another problem.

By P. M. Heldt

ECONOMICAL production of motorcycles presents special problems, as a very large number of small parts must be handled and, owing to the high stresses imposed on the working parts of such machines, high-grade materials and accurate machine work are essential. Numerous parts require heat treatment and, as practically all parts of the machine are made from ferrous metals and, in service, are constantly exposed to the elements, electroplating and other methods of rust-proofing find extensive application.

On a recent visit to the Hendee Mfg. Co., the writer had an opportunity of studying the methods in use in that plant, which is said to be the largest factory in the world devoted exclusively to the production of motorcycles. The annual capacity of the plant is in the neighborhood of 30,000 complete machines. It must be remembered that motorcycles are not produced on the assembling plan, but practically every part is turned out from the raw materials on the spot.

Until recently, the Hendee Mfg. Co. had been devoting most of its energies to the production of motorcycles of the heavier type, with a piston displacement of 61 cu. in., which are particularly adapted for side-car work. Side-cars, therefore, form an important product of the concern, and the side-car department was one of the first visited.

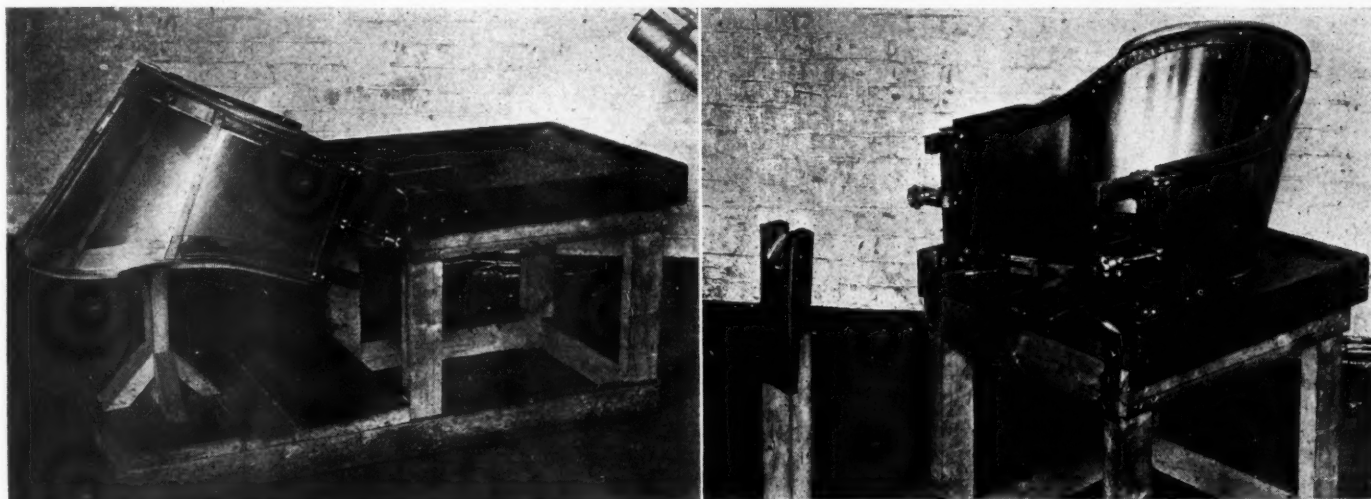
The Indian side-car was formerly made with five steel panels, but only three are used in the latest design. The seat has a wooden frame, and a wooden floor board and

seat board are also used. High-grade ash is employed for this purpose. The frame is stiffened by forged angles and 5/16-in. round reinforcements are rolled into the panels. The panels are fastened to the wood frame by wood screws. In order to prevent warping of the seat board, the latter is made of several overlapping pieces. A pressed steel tool pan is placed under the side-car seat.

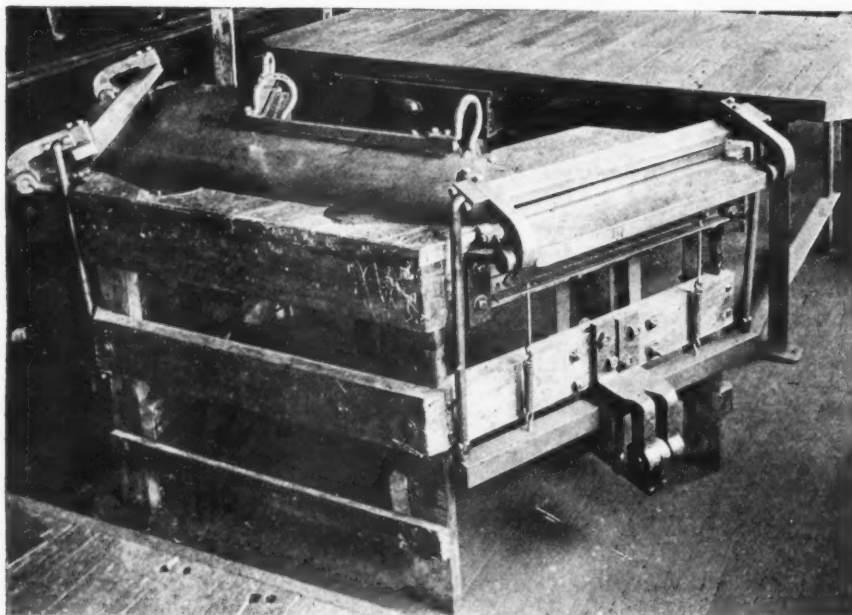
The shape of the panel is marked on the sheet by pattern, after which the panel is cut out with a rotary bevel shear and trimmed by hand. One of the illustrations herewith shows a table for bending the flanges of the lower body to the proper form. The panel, in one piece, is laid on the table. Then bending bars are lowered by a treadle, and the flanges are turned up against the bars by means of a mallet. This special fixture was designed by the foreman of the Hendee side-car department.

Next, the sheet or panel is placed on a special fixture for beating down the crimped edges on the seat panels. Both the top and bottom edges of this panel are crimped in a special crimping machine. The fixture, in which the edges are turned over, is of substantially the same form as the seat frame and is mounted on hinges so that it can be turned over and both the top and the bottom edges worked upon with comfort.

The crimping permits of readily turning over the edges of the sheet, even though the latter is strongly curved, without injuring the smoothness of the panel itself. When the edge of a curved sheet is bent through an angle of 90



Special fixture for beating down crimped flanges on Indian side-car seat panel—in its two working positions



Special table for bending flanges of side-car lower body to proper form

deg. it has to shorten if bent to the inside of the curve, and the crimping permits this shortening to take place. The fixture just described also forms the panel into the proper shape for attaching it to the lower body, immediately the flanges are beaten over. This fixture or jig consists of a stiff inner steel frame and a light flexible outer frame, which serves to clamp or hold the panel to the inner frame.

The tool box, referred to in the foregoing, is a steel trav with its joints spot-welded.

The side-car is mounted on four springs, viz., two quarter elliptic front springs and two rear springs. Only two sets of frame forgings are used for joining the frame tubes of the side-car frames. Where the open ends are not needed they are plugged. The bolt in the semi-elliptic spring is used as a gage to show how to mount the spring. Hard steel bushings are used in the rear springs.

Before an order of parts is packed for shipment, each part is thoroughly sprayed with heavy oil to protect it against rust while en route. A Eureka air spray, mounted

under a hood, is used for this purpose. An electric fan in the top of the hood, which is at the bottom of a stack, draws away the superfluous oil.

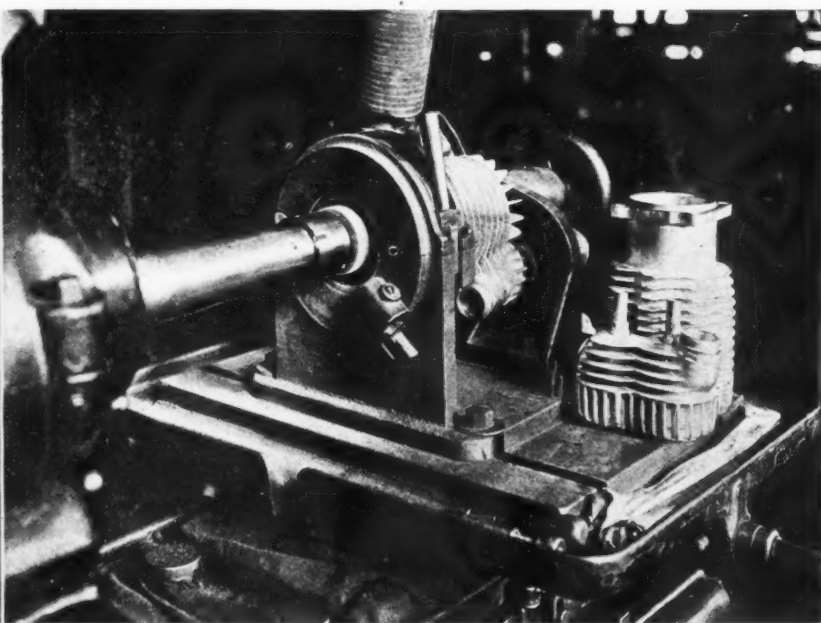
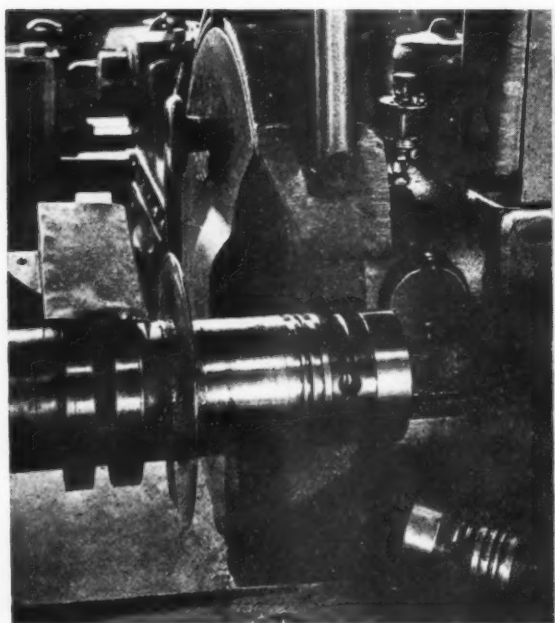
The oil tank of the motorcycle is fitted with a hand pump, which is used to supply additional oil to the crankcase when the motorcycle is being driven at upward of 40 m.p.h. There are two fuel tanks on each motorcycle, and each tank consists of two parts, an outer and an inner one, the outer part being made in the punch press. The filler hole is stamped in, while the smaller holes required are drilled on a jig. There are reinforcements on the inside of the tank where the two units of the tank are held together by means of straps. The fittings are soldered in.

Each tank has a wire gauze over the outlet to prevent any particles of solder or other solid matter finding their way into the tank getting into the carburetor nozzle. A tube below the filler spout prevents splashing. The tanks are provided with two vertical baffle plates, which divide the tank into substantially equal compartments. A needle valve in the outlet extends through the top of the tank to within convenient reach of the driver. The two halves of each tank are soldered together.

Mud guards of the crowned type are fitted. These are made in the Hendee factory. They are rolled and have their edges beaded and the holes are then punched in. The muffler has the tail pipe spot-welded into the end. There is also a cut-out in the end of the muffler, which consists of a three-port registering valve. A reinforcing ring is spot-welded into the muffler head.

Valve rocker levers are finished on the outside on a profiling machine. Sprocket wheels are generated in Gould & Eberhardt automatic gear cutters. Eight of the wheels are put in the machine at the same time. These wheels have a very light web, and, in order to prevent shattering and distortion, they are put in a holder while the cutting is being done.

The frames are assembled in a vise, each vise being se-



Left—Piston grinding in Hendee factory. Special magnetic chuck holds work. Right—Grinding cylinders on Heald grinder

cured to a post. Such parts as mud guards, braces, etc., are carried on racks and hooks on the post. After the frames have been assembled, they are placed on the assembling stands, which are about 18 in. off the floor. The wheels come to the assembling line complete with hubs, sprockets, external and internal brakes and brake anchorage. Each man assembles machines completely on his own stand, and about 1½ hr. are required for assembling one machine.

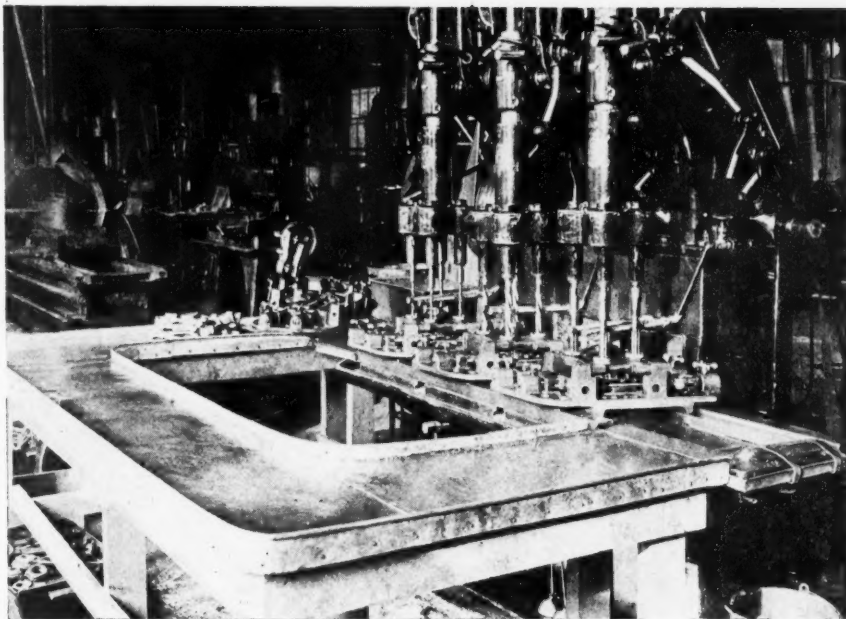
A crankcase relief valve is provided, this being a valve of the rotary type, which maintains communication between the inside of the crankcase and the atmosphere during the period the piston descends. Any oil forced out of the crankcase through the relief valve during this period has to pass through the timing gear case, then through the breather and relief pipe, which latter discharges into the front chain case, right onto the sprocket wheel. There is a cup on the valve push rod guides which serves to keep a puddle of oil on the guide.

Valves are ground in a four-spindle automatic machine which was originally designed for the Hendee company. It has a rack and pinion motion, giving the spindles about one-half revolution. A face cam lifts all spindles about every 20 turns.

Of considerable interest is the nickel plating installation, which was manufactured by Manning & Co. This is an automatic plant in which the parts to be nickeled pass from bath to bath.

The parts to be nickeled are carried on cross bars at the bottom of vertical bars, which are provided with two rollers each, and are compelled to follow an undulating path, moving the parts through the bath, and then lifting them out of one bath and lowering them into another. Previous to being lowered into the nickel bath, in which they remain about 3 min., the parts are cleaned in a potash bath, and between succeeding plating baths they are rinsed in clean water.

The cylinder castings are sand blasted inside and out,



Boring and reaming connecting-rod big ends

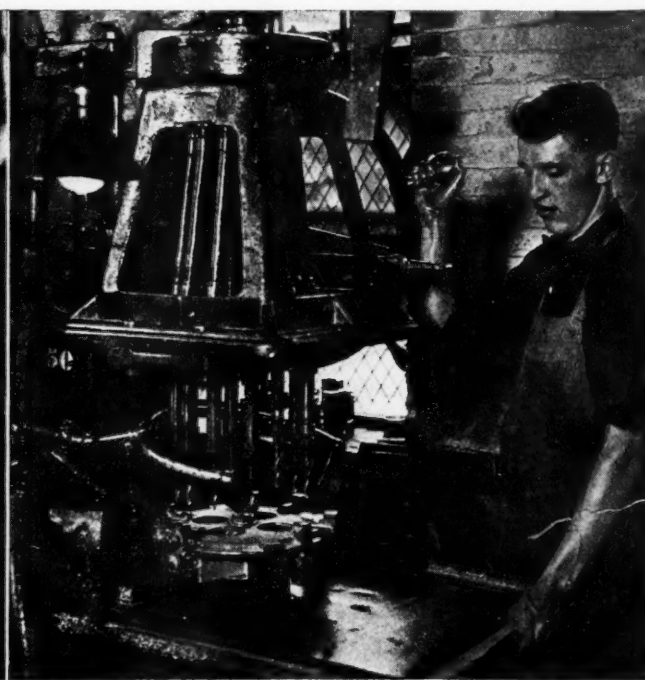
this operation being performed on a revolving table. The sand blast is also applied to the transmission gears after they have been heat treated, and the inlet and exhaust tubes are sand blasted internally to make the interior surface as smooth as possible and thus reduce the resistance to air flow. The cylinders are nickel plated on the outside, to protect them against rust, with what is known as a white nickel finish. The bore is first turned out and then finished by grinding.

A considerable amount of stamping is done in the plant, the stamped parts including the mud guard, front extension, wrenches, clutch discs, battery box, tool box, mud guard wings, muffler heads, clutch locking ring and chain guard.

A special machine for machining the seat cluster and head forging was designed and built in the Hendee factory. Three of these units are in use. Five hollow-milling operations are performed at the same time, all of the tools

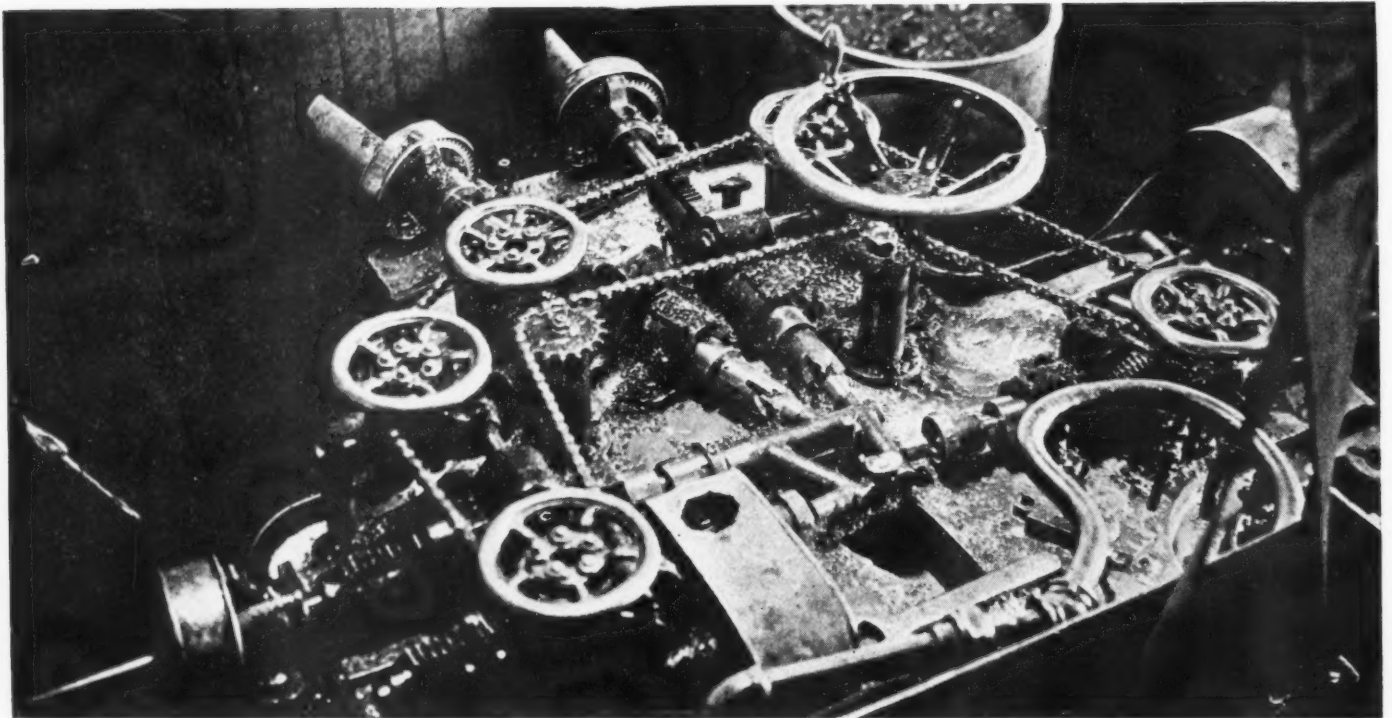


Valve grinding machine



Drilling lug-holes in crankcase in one operation

The Most Important Links In the



Hollow milling ends of frame, rear upper bracket

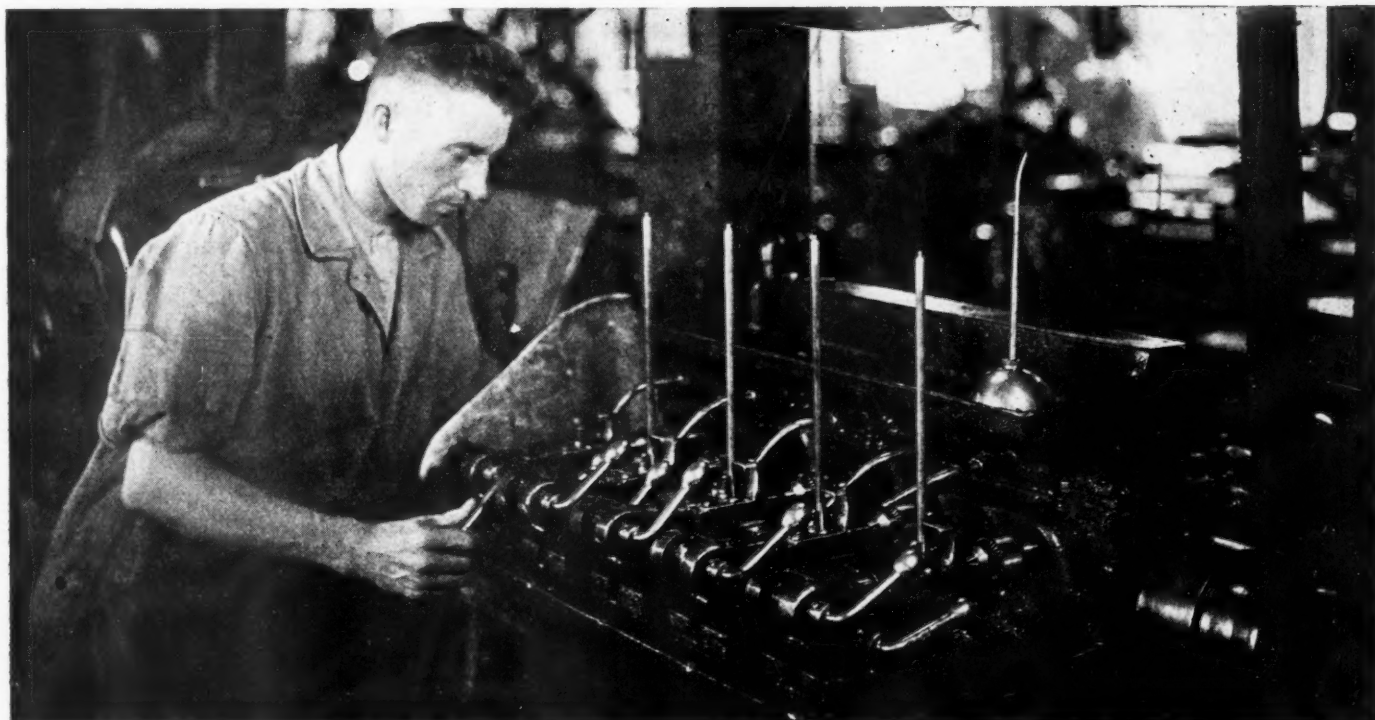


Multiple drilling and tapping machine with rotating table. Used for boring bushings



Drilling 18 to 20 spoke holes in hub flanges at one operation

Production Are Especially Designed



Horizontal five-spindle sensitive drill, used for drilling small holes in control rods, etc. One complete hole per minute in each spindle. Automatic feed



Final inspection of wheel



Preliminary stringing up of wheels



Vertical miller with rotating table for milling three-speed brackets

being fed simultaneously by means of a chain and worm gear, and provision being made for individual adjustment. Other machines, similar to this, are used for boring and milling the rear frame brackets and steering heads.

Another interesting tool is a five-spindle automatic feed drill for drilling the hole for the locking screw in the piston pin. Only 20 sec. is required for drilling each hole, and all the operator has to do is to place the pins in the machine and take them out. There is also in use a multiple

drilling and tapping machine with a rotating table, another product of the Hendee tool room. This is used for boring bushings, etc. It has eight spindles, which are working simultaneously. In addition to its rotary motion, the table has a vertical feed. The work is held in automatically operating vises. This machine has been in use for more than 12 years. It is reloaded while the work is going on, and hence is fully in line with the most modern ideas in machine tool design.

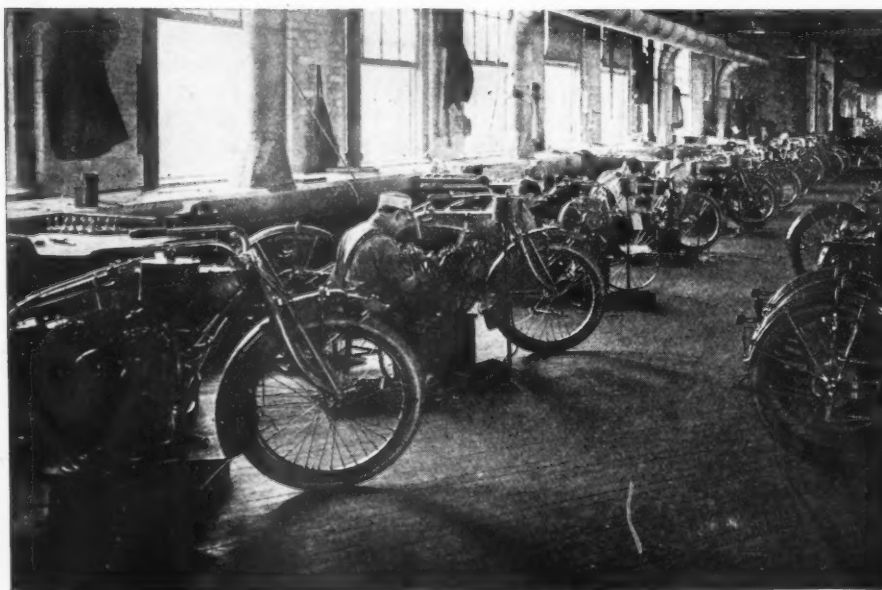
Spoke flanges on the hubs are also drilled in a multiple spindle drill. One of these drills has 10 spindles and drills the 20 holes in each flange in two operations.

Face-milling of the three-speed bracket is accomplished in Brown & Sharpe milling machines. These are provided each with a rotary table containing eight fixtures for surfacing the brackets.

After the frame has been brazed and cleaned, it is necessary to straighten it, for which purpose a special fixture is provided. This is of heavy cast iron construction and the frame fits into it in an upright position. Pry bars are used for straightening the frames and a multiplying indicator for indicating any want of alignment.

An interesting operation is that of assembling the wheels. One man puts the spokes through the hub, whereupon the hubs are put on a dowel on a square bench or table, which has four blocks, on which the rim is placed to bring it concentric with the hub. Two men work at each of these tables, one putting the nipples in and starting them on the thread of the spokes, the other drawing them up in a preliminary way with a brace. Then the wheels are put into a fixture with 18 jaws, which are moved inwardly simultaneously by means of a spiral groove.

The nipples are drawn up by a brace. The workmen know from experience just how tight to draw the nipples, and come very close to getting the wheel running true by merely gaging the pressure they put on the brace. However, the final trimming is accomplished in another fixture in which the wheels are spun, and a piece of chalk is held against the rim to mark that portion which is out. The final adjustment of the spokes is accomplished by means of a brace. The wheels are enamelled black by means of an air spray in a hood. During this operation, caps are placed over the ends of the hubs to prevent enamel getting to the inside and covering up the threads.



The test room. Inset shows cooling fan used by testers, also testing gasoline tank on stand



Hunting for 900 Missing A. E. F. Cars

Good work by the American Secret Police has done much to check the epidemic of car stealing that gripped France during the war. Amusing stories are told of how cars were lost and recovered. The A. W. O. L. soldier often sees Paris on proceeds of an illegal trade. Officers with criminal inclinations put through big deals.

By W. F. Bradley

PARIS, July 10.

NINE hundred automobiles are missing from the American Army. A small number of these were abandoned on the front and fell into German hands and will doubtless be found in German territory. The great majority have been stolen and are being searched for on French territory. For several weeks the police in the advanced zone, specially detailed for this work, returned stolen cars at the rate of three a day.

The car-stealing epidemic is strong in France, and is not confined to any one class, or to any one nationality. Some of the thieves are in the American Army; some are found among French farmers. The crudest kind of thief is the doughboy who decides to become A. W. O. L. Offering his car to some unscrupulous Frenchman for a few hundred dollars, he enjoys the delights of Paris until an unsentimental M. P. puts an end to his adventures.

At the other end of the line is the criminal officer who, by some means or other, got a commission in the army and takes advantage of it to get rich quick. One such individual was selling cars on the docks to Frenchmen who were too anxious to get delivery to ask if the seller had a right to the functions he was holding.

Unfortunately for this enterprising individual, he was called to give an account of his operations before he could get clear of the service.

Abandoning Car on Roadside Dangerous

If a car is left by the roadside in France it is certain to disappear in an incredibly short time. Maybe the first farmer coming along takes an idea that the countryside should be cleaned up. He hitches his horses to the damaged automobile and hauls it to his farm, taking care to cover his tracks as he goes along.

As an automobile inside a French farmyard would not harmonize with the general scheme of decoration, the Frenchman sets to work to build a haystack around it. Then he sits around and looks innocent.

Presently the American secret police slip into the yard, and without asking anybody's permission proceed to push a long iron rod right through the haystack at a correctly determined distance from the ground. If the rod meets with opposition they pull the entire haystack to the ground, despite the voluminous protests of the owner, and reveal a Cadillac or a Ford.

Whereupon, of course, there is consternation; nobody can explain how an American automobile came to hide itself inside a French haystack, but as the American police are not much interested in any explanation, the machine merely is hauled away.

Another class of thief is the motor mechanic who has

gone into the automobile business as a side line. Army regulations require every officer and man to deliver all the goods he has signed for. If by any means an organization can add a thirteenth car to the twelve it is officially credited with, that organization is one car to the good and nobody is apparently the poorer.

It is not necessary to start with a complete extra car. A machine breaks down by the roadside and the driver trudges away for help. In the meantime there comes along an automobile carrying a few mechanics. Within five minutes the magneto, the carbureter, the spark plugs, the spare tires and the spare wheel have been transferred to the passing car, and go to swell the stock of some distant organization.

Or, if they have time and a tow rope, the mechanics may take the entire machine with them. If it is claimed later, they can prove that they have done a good action. If it is forgotten, it is not a difficult matter to turn it into cash.

Making Abandoned Cars Thief-Proof

So much eagerness was displayed by everybody to "take care" of cars temporarily abandoned by the roadside, that general orders were issued calling for drivers to render their car thief-proof before abandoning it. There were four standard methods of making a car proof against the attention of amateurs, one of them being the removal of the magneto. Nothing but an armed guard, however, seems to be efficient in keeping thieves from removing an abandoned car.

Here is one true case. Last winter three Fords were being driven up to the front in a snowstorm. A real blizzard was raging, and they made progress slowly. Just as night was falling they struck a snowdrift, which blocked more than half the road.

One of the cars, in trying to get through, skidded so badly that a rear wheel was broken. Conditions were so bad that there was no other traffic on the road. After waiting an hour, and trying to patch up the smashed wheel, a liaison car—one of the few vehicles which must keep going, whatever the conditions—came in sight and informed the drivers of the Fords that there was a motor transport depot at Neufchatel, twelve miles away. At a nearby village telephone communication was obtained with Neufchatel, and a request made for the breakdown truck to be sent. This truck happened to be on the road at the time and, as it was impossible for the drivers to stay by their vehicle all night under such weather conditions, the motor transport officer gave permission for the car to be abandoned, after all reasonable precautions had been taken.

The radiator was drained, the coils removed and spare

tires, tools and cushions put into the liaison car. The next morning at 7 o'clock the drivers of the Ford returned to the scene of the accident with a breakdown truck. During the night somebody had removed the three good wheels, the engine, the steering gear, and the radiator. They never were traced.

Soldiers may be caught red-handed in the act of stripping a car by the roadside, without it being possible to prove that they are doing other than a good action in saving Uncle Sam's property from complete destruction. The police came upon such a group hard at work.

"What are you fellows doing there?" they yelled.

One of the men, who seemed to be the leader, calmly replied:

"Why, I guess we are salvaging this pile of junk."

"He put up such a good story," said the police officer, "regarding the criminality of allowing a wrecked automobile to lie by the roadside where it might be stripped by the first civilian thieves who came along that although I felt convinced he and his companions were working in their own interests, I was obliged to let them go."

Stolen Cars Easily Traced

The secret police attached to the American forces in France have been very successful in tracing stolen automobiles. It is not always possible to catch the original thief, but the intermediary who undertakes to dispose of a machine lays himself open to quick detection.

When a Ford has had its army numbers painted out, it is practically impossible for anybody to prove that the car ever did belong to the American Expeditionary Forces. The great majority of passenger cars in the American army service, however, were unknown to France before the war. They comprise Cadillacs, Packards, Wintons, Locomobiles, Whites and Pierce-Arrows in numerical importance.

When one of these is offered for sale, it is little use trying to disguise the fact that it came over originally with the Expeditionary Forces. Cautious buyers apply to headquarters, asking if car number so-and-so is an honest deal or not. In such cases the American police ask the visitor to go through with the deal, and to keep them informed where the money will be handed over.

Just at the dramatic moment, a French gendarme and an American secret policeman happen to appear on the scene.

Again and again, a French business man will drop into the motor transport office at the Elysée Palace Hotel and remark: "I want to buy some of your automobiles."

He is told the stereotyped story that the American army has no automobiles to sell. The disposal of the material is in the hands of the French Government, and possibly at a later date the French authorities will offer the machines for sale.

As the average Frenchman is a pronounced individualist, with a belief that laws and regulations are made for the other fellow, and the exceptions for himself, he smiles knowingly, and remarks:

"That's all right! I quite understand that officially you are not selling anything, but on the quiet you are getting rid of your automobiles, and I am here to talk business."

As the American officer still looks incredulous, the Frenchman becomes more confidential and finally remarks:

"Just to prove that I know you are selling automobiles, I will give you the names of some of the purchasers," which he at once proceeds to reel off. The officer appears to be impressed by this, for he remarks:

"Well, Mr. ——— I did not catch your name—Mr. Dupont, you seem to be well informed, and if you will kindly leave your address I will get in touch with you. It is just possible that some of our departments are disposing of a small number of automobiles and, if I find that this is

the case, I shall be delighted to call you up and let you make us bids."

Exit Mr. Dupont, delighted.

Unknown to the visitor, shorthand notes of this conversation have been taken by a soldier sitting in one corner of the office. Within five minutes of the departure of the would-be purchaser, the transport officer is in telephonic communication with the army police, to whom he communicates the names and addresses of the persons who are alleged to have "bought" American army automobiles. Numbers of thieves have been caught in this way.

An Army Wallingford

Early this year, Jean Smartly, an American officer of French origin, had settled the whole question of the disposal of American army automobiles. An agreement had been arrived at whereby these vehicles were to be sold, under the control of the French Government, in lots of fifty, the price of Cadillacs to be 18,000 francs (\$3,600) and the price of Fords 4250 francs (\$850) each. The scheme was all cut and dried, and only needed the signature of the Minister of Finance.

So certain was he that the scheme would go through, that Capt. Jean Smartly had obtained an option on one of the lots of fifty Cadillacs, but was willing to let in a few of his friends on the deal. As they say over here, the friends marched, and the captain pocketed numerous deposits for Cadillacs and Fords which would be delivered when the agreement had been signed by the French Government.

As this was quite a confidential piece of business, Capt. Jean Smartly never was called upon to deliver the goods. His downfall came in another way.

After having sold an option on the Gaumont Palace—the biggest picture house in Paris—quite unknown to the owner of that establishment, he endeavored to dispose of the Paris subway in the same manner. But the credulity of his victims would not run to this extent and, instead of a sale, there was an inquiry, with the result that the enterprising officer is now back in the United States and is being entertained at Federal expense.

A New Condenser

HERE is a new device designed to go on the radiators of automobiles and other automotive apparatus. It acts as a condenser of both water vapor and alcohol vapor (in case an alcohol non-freezing solution is used) and also as a temperature indicator. Alcohol is used very largely as a non-freezing cooling medium, practically the only objection against it being that it evaporates rapidly, and that the density of the solution and its freezing points therefore constantly change. This condenser, it is claimed, will condense all of the vapors from the solution and return them to the radiator, with the result that the density of the solution remains practically constant.

In the top of the condenser there is a safety valve, which, when the engine becomes overheated, owing to lack of water, oil, etc., gives a distinct signal which cannot be missed. During the summer season the condenser serves chiefly as a water vapor condenser, and offers the advantage that it obviates the necessity for frequently refilling the radiators. As the same water can thus be used on the radiator for long periods of time, heavy lime deposits, which tend to reduce the efficiency of the radiators, are obviated.

The device is known as the J. G. Conedenser and is manufactured by the Conedenser Mfg. Co.



Functions of the Condenser in High-Tension Magnetos

A Comparison of the Phenomena, Both with and Without a Condenser Connected and a Discussion of the Characteristics of the High-Tension Spark

By Harry F. Geist, E.E.*

PRODUCTION of the high potential necessary for a "jump" spark is accomplished in practically all magneto high-tension ignition systems by the use of the induction principle rather than by the direct generation of electrical energy.

In connection with this electrical potential or force, it must be understood that the high-tension spark in its jump results from the "inertia" of a rapidly built up electro-static stress as well as from the pure potential of that stress.

While this stress is called static, it is in motion while being built up and therefore follows dynamic laws, so, even though the term "inertia" is one that belongs strictly to the science of mechanics and cannot be applied literally to an imponderable force such as electricity, yet there is sufficient analogy in this case to merit its use in the absence of a suitable electrical term.

The maximum voltage generated per turn in an open circuited coil due to flux shift caused purely by the motion of the magneto rotor is very low for practical rotor speeds, so that a large number of turns, meaning a coil excessive in size, would be required for a potential sufficient to produce a jump spark. Furthermore, even assuming such a coil permissible, the wave shape of the potential generated could not be made steep enough in its rise to the maximum value so that one could be sure of just what position the rotor would be in when the spark occurred. This is especially true when the speed changes, so that the ignition timing for the engine would be very uncertain. Moreover, with this wave form, the "inertia" of the generated stress would not be very high and a higher potential would therefore be necessary than is required by the use of the induction principle.

In the use of the induction principle, the magneto is first operated for a period with its generating or primary winding on closed circuit, so that the energy is generated and stored in the form of a reactive magnetic field. When the spark is desired, the circuit is suddenly interrupted mechanically, resulting in a very sudden magnetic readjustment that is accentuated by the action of the condenser, inducing a relatively high voltage per turn in the winding. This induced voltage is perhaps fifteen to twenty times that generated directly due to rotor motion.

Moreover, the closed circuit operation of the machine is such that the magneto generates and stores its normal energy amount at a comparatively low speed and increases only very slightly for higher speeds over a wide range, so that with the mechanical breaker serving as a timer for the spark, the sparking operation of the magneto is practically uniform over the entire range of speeds for which it is designed.

The quickness with which the magnetic readjustments

occur, following the interruption of the primary circuit, therefore not only sets up a very high voltage per turn in the windings, but induces this voltage practically independent of rotor speed, and so rapidly that a very high value of electrical inertia results.

The induction principle finds its most efficient application in the self-contained high-tension magneto.

Whether this magneto be of the "armature wound" type, the "rotary field" type or the "inductor" type, dependent upon the mechanical means for producing relative motion between the flux from the magnets and the windings, it consists in general of a primary and a secondary coil, wound in mutual inductive relation to each other upon an iron core that forms a principal part of the magnetic circuit of the machine. The primary winding short-circuits through a breaker mechanism, across the contact points of which is shunted a condenser, so that when the breaker interrupts the circuit, the condenser is suddenly made a part of the primary circuit. The secondary circuit consists simply of a coil of many turns of fine wire that is insulated from the primary and the core so as to withstand the high potential induced. This secondary winding, which usually has anywhere from 8000 to 12,000 turns, will transform the energy of the machine to a potential sufficient to produce a "jump" spark at the gap of the spark plug of the engine at which it terminates.

The high tension magneto must first generate and store its energy in the primary winding and interlinked magnetic circuits during closed circuit. When the machine is thus energized and the primary circuit is interrupted, causing the condenser to act, the machine is suddenly changed from a generator and storer of energy to a transformer, and the electrical conditions that are necessary to high energy generation and storage must also permit efficient transformation.

The manner in which the stored energy will be transformed and transferred from the primary to the secondary circuit for delivery to the spark depends almost entirely upon the functions performed by the condenser, so that the condenser may be regarded as a transformation agent of the system, and thus largely responsible for the efficiency of the transfer of energy to the spark.

Electricity is no doubt the most flexible of all forms of energy in that it may exist in the almost purely electromagnetic form or in the almost purely electro-static form or in any proportion of these two components with the property that permits of its being changed from one form to the other in very brief intervals of time. It is this change of its form that is referred to as transformation, while transfer of the energy refers to its absorption by one circuit from another interlinked magnetically with it.

The amount of the energy and the suddenness with which it can be changed gives rise to the electrical inertia that is

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so valuable an aid in the production of a high tension ignition spark.

It is the purpose of this article to explain the functions of the condenser in the high-tension magneto, and to endeavor to point out by graphical illustrations just how the condenser plays such an important part in producing the transformation of energy so quickly that a high value of electrical inertia is obtained and an efficient transfer of energy to the spark is produced.

The action of the condenser is so much a part of the complete sparking phenomena of the magneto that it will be almost impossible to explain its functions without entering into a more or less complete discussion of the sparking phenomena, so that the scope of this treatment may be considered to cover briefly the induction principle of high-tension ignition spark production.

To simplify the treatment of the subject, the magneto

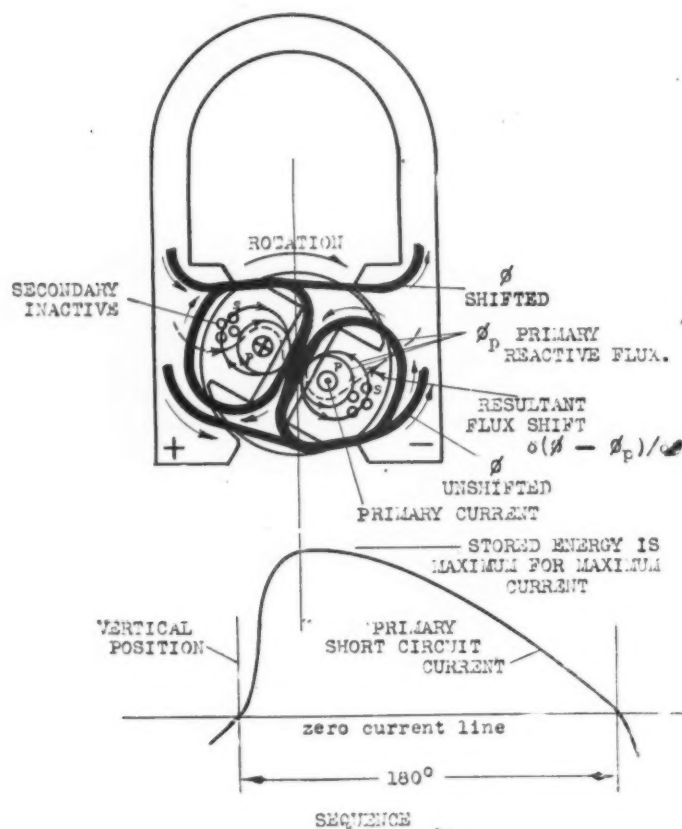


Fig. 1—Closed circuit operation

will be studied under three different physical conditions, namely:

First—Cam Removed.

Second—Cam in Place, Condenser Disconnected.

Third—Condenser Connected, Machine Complete.

The energization of the machine, due to rotor motion, under the first condition, will be treated briefly as an introduction to the second and third conditions.

Under the second and third conditions, the phenomena, both with and without the condenser connected in the primary circuit, are intended to serve as a simple and direct comparison of the resulting phenomena to reveal the functions of the condenser.

Cam Removed

With the cam removed from the magneto, the breaker mechanism is, of course, rendered inoperative, and the primary circuit will be under continual short circuit, so that current will alternate in the primary winding as the

motion of the rotor shifts the flux and generates the energy.

In Fig. 1 is shown the current-armature position curve of the primary circuit of an armature wound type magneto, showing the manner in which the current is produced for one complete reversal of the magnetic flux with respect to the coil, i.e., for one complete half revolution of the armature.

The amount of energy stored electro-magnetically in the machine will be about at a maximum when the current reaches its maximum value, for normal operating speed.

Fig. 1 also shows, diagrammatically, the flux distribution in the magnetic circuits of the machine for that position of the armature at which maximum energization exists. This diagram shows a distribution that is typical for the entire energy storage range on which a spark could be produced.

The stored energy of the machine is represented in the presence of the reactive flux and in the distortion of the excitation flux, due to the reactive flux. This distribution represents energy because it is entirely different from what the distribution would be on open circuit for the same armature position, so that it follows directly that a sudden change from the short circuit to the open circuit condition results in the delivery of this energy through a readjustment of the magnetic field.

The diagram shows the excitation flux Φ both shifted and unshifted, and the presence of the loops of reactive flux Φ_P due to current flow in the primary coil that is generated by the resultant flux shifting rate $\delta(\Phi - \Phi_P)/\delta t$. It will be noticed that these loops of reactive flux which interlink with the primary winding take paths through the armature core and the field pole pieces, and thus interlink the secondary winding also. The secondary coil being open circuited is inactive except for a low voltage generated that is of no consequence. The stored energy, it is evident, is supported entirely by the primary circuit.

With the machine thus energized at its maximum the armature is in a position to deliver the energy in the form of a spark.

Cam in Place, Condenser Disconnected

With the cam in place, the breaker will operate and interrupt the primary circuit, and is assumed to be so set as to produce the interruption at about the armature position represented in Fig. 1.

Under the assumed condition of having the condenser disconnected, when the circuit is interrupted, no matter how suddenly, the current will continue to flow across the gap, due to the inductance of the circuit, making a path for itself from contact point to contact point in the form of an electrical arc.

As the gap becomes greater and as the stored energy rapidly spends itself in the arc, the current drops off in value faster and faster, until the energy is about all dissipated and the arc, of course, disappears.

The manner in which the current drops off from its maximum value to zero, during the life of the arc, following the interruption of the primary circuit, is shown in the primary current-time graph of Fig. 2. The curve above it shows how the voltage, induced in the primary circuit with the fall of current, following the law

$$e = KL \delta i / \delta t,$$

rises from a zero value at the instant of break to a maximum peak value at the instant the rate of current fall $\delta i / \delta t$ is the greatest. In this expression for induced voltage, L designates inductance and K is a constant that depends for its value upon the amount of excitation flux combined with the reactive flux producing e for different armature positions.

Until this instant of maximum induced voltage, the sec-

ondary circuit, being metallically open circuited at the spark plug gap, is inoperative, but since about the same induced voltage set up per turn in the primary winding is induced per turn in the secondary winding just as in any transformer, and since the secondary coil is wound with many turns of fine wire, the total secondary voltage may be sufficient under the conditions to produce a spark at the gap. If it does, it will, however, be a very feeble one, because most of the stored energy has already been dissipated in the form of an arc at the contact points of the breaker.

This is more apparent from a study of the third and fourth graphs of Fig. 2. The latter or lower curve shows the power characteristics of the primary breaker arc, and is calculable directly from the primary induced voltage across the contact points and the primary arcing current simultaneous with it, as represented in the two upper curves, from the simple and well known law ($p = ei$). The area enclosed by the power curve (shown shaded) is a direct measure of the energy represented in the arc. The third graph shows the secondary dynamic current flow, following the arc-over by the secondary circuit at the spark plug, in its relation to the power of the arc and to the instant of break of the primary circuit, and shows that, inasmuch as the high-tension spark cannot begin until the maximum induced voltage has been set up, and inasmuch as the maximum induced voltage peak under the assumed conditions does not occur until almost all of the stored energy has been spent in the primary breaker arc, the high-tension spark will, if at all, be very feeble.

Therefore, while it is possible to produce a high-tension spark under the above assumed conditions, that is, without a condenser, the transformation and the transfer of energy will be very poor. The arcing at the contact points would also be disastrous to them in a very short time.

It must be apparent from a study of the primary arc power curve of Fig. 2 that the thing desired for an efficient transformation and transfer of energy to the secondary circuit is that the maximum induced voltage shall occur

as soon after the instant of primary interruption as possible, i.e., before the primary arc gets much of a start, for it will be seen that as the primary arcing power rises from zero to its maximum value, it allows an appreciable time at lower power values before the amount of energy spent becomes of much importance.

The ability of the condenser to cause the maximum induced voltage to occur almost instantaneously following break and before the primary circuit can get started arcing is one of its most important characteristics in the magneto, and is explained in the following.

Condenser Connected, Machine Complete

The condenser, it is well known, consists essentially of two metallic areas separated from each other by a dielectric. In order to reduce this condenser to its smallest possible size, it is made up of a number of thin leaves of tin foil interspaced by thin sheets of mica, and the whole is bound together through a baking process under pressure by the use of shellac. Proper terminals are connected to each half of the foil leaves, which are stacked alternately so that both sides of the foil present useful areas. Mica is the dielectric usually used in magneto manufacture, because it is a very strong insulator against both disruption and leakage, even in very thin sheets, and it also has a relatively high specific inductive capacity. The greater the areas presented by the oppositely connected tin foils, and the closer together they are pressed, the greater will be the capacity of the condenser.

However, the condenser only handles a very small part of the energy represented in the sparking phenomena of the magneto, so that capacity is not the most important consideration in the condenser and the functions it has to perform. It is the fact that the action of the condenser is almost purely electro-static, and that electro-static phenomena are very much quicker than electro-magnetic phenomena, which makes the condenser of so much value to this type of machine.

The instant the contact points of the breaker interrupt the energized primary circuit, the empty condenser, acting

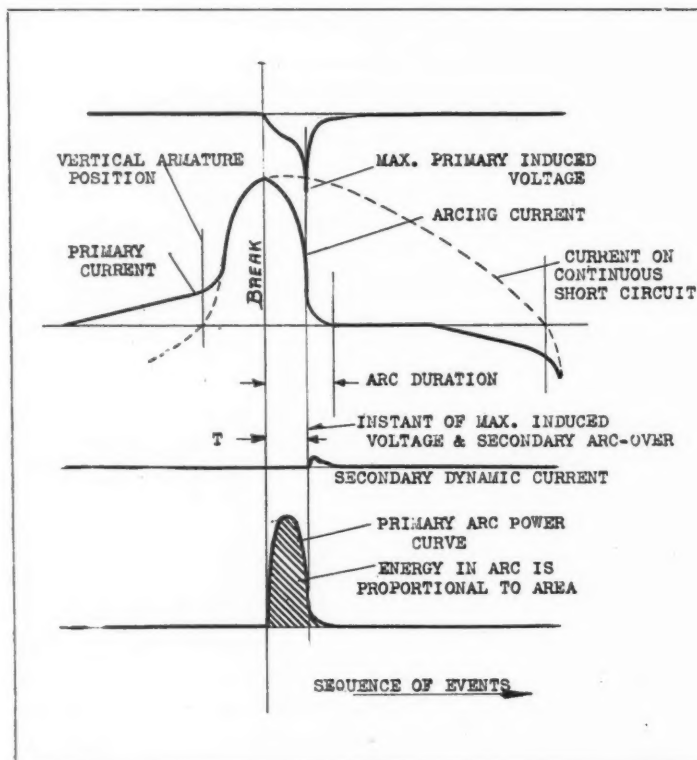


Fig. 2—Interruption of primary circuit without condenser

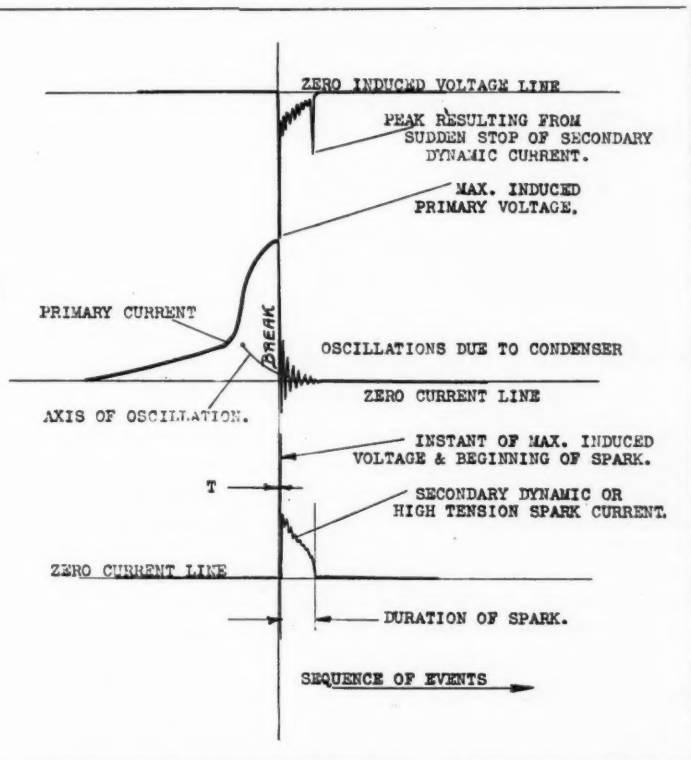


Fig. 3—Interruption of primary circuit with condenser

as a sort of an electrical vacuum, suddenly becomes a part of the primary circuit and begins to take on an electrical charge at a very high rate.

The rate at which the condenser will take on its charge is best seen from the equation for the condenser charging current, which is

$$i = C \partial e / \partial t,$$

where C is the inductive capacity and $\partial e / \partial t$ expresses the rate at which the voltage increases across the terminals of the condenser as it takes on its charge.

In connection with this law ($i = C \partial e / \partial t$), as the primary tends to give up its energy to the condenser, and its current drops accordingly, an induced voltage

$$e = KL \partial i / \partial t$$

is set up across the terminals of the winding. But the terminals of the winding and of the condenser are the same, in that both terminate at the contact points of the breaker, so that these two laws must tend to work together.

It is evident that the faster the condenser tends to take on its charge, the faster the current will tend to drop in the primary winding, with the result that the induced voltage across the winding increases. With this increase impressed directly upon the condenser, the faster still, it is seen, the condenser will take on its charge. Thus the two inductive effects expressed in the above equations tend to co-operate to produce the maximum induced voltage in the machine at the earliest possible moment after break, and it actually occurs almost instantaneously after the interruption of the primary circuit.

Fig. 3 is a graphical representation of the phenomena of sparking of the high-tension magneto.

The upper curve of this figure shows how quickly the primary induced voltage attains its maximum value following break, while the primary current makes its very sudden drop toward zero value. The secondary voltage will be practically the same as that induced in the primary, but, of course, very much higher in value.

The lower curve shows how the secondary dynamic or high-tension spark current, beginning at the instant T , after break, rises to its maximum and then dies out. The instant T , after break, is simultaneous with the instant of maximum induced voltage.

It so happens that when a condenser takes on a charge of electro-static energy from an electro-magnetic source involving the two laws

$$i = C \partial e / \partial t \text{ and } e = L \partial i / \partial t$$

as previously pointed out, it takes the charge on at such a high rate that electrical inertia comes into play and it over-charges until it reaches a point where it has to discharge back to the electro-magnetic source. The discharge is also over-done, so that the energy involved is changed back and forth from electro-magnetic to electro-static form and vice versa, in an oscillatory manner until it is lost in the resistance and iron of the circuits.

This oscillatory action of the energy handled by the condenser is shown in Fig. 3 by the manner in which the primary current falls below and rises above an axis of oscillation until it finally dies out on the zero current line. The effect of these oscillations is felt both by the voltage induced in the windings and the high-tension spark current as shown by the curves. A study of these curves shows that the induced voltage and the secondary current are unidirectional, while the primary current oscillates, so that it is evident that the same flux cannot be involved in the entire primary and secondary phenomena.

Magnetic Phenomena

In discussing the flux distribution diagram of Fig. 1, it was pointed out that the stored energy was supported during closed circuit by the primary winding entirely, and

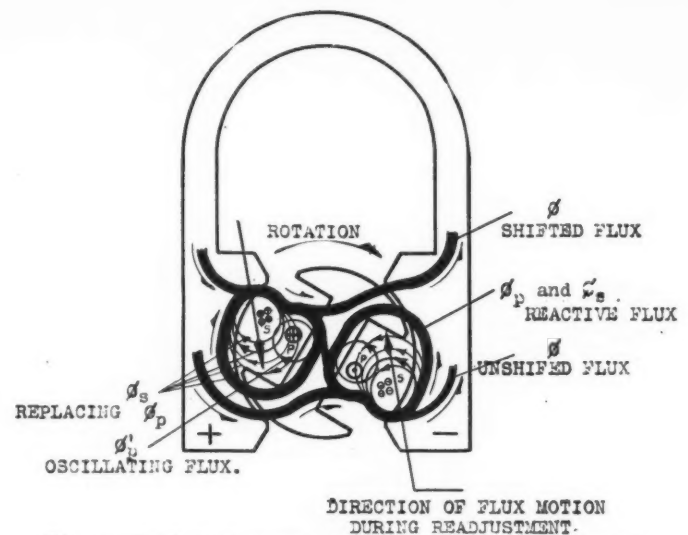


Fig. 4—Period of energy transfer (flux motion during sparking is independent of rotor motion)

that the effect of the reactive flux which represents that energy is to interlink itself with the secondary winding. It is very important at this time to appreciate that all the loops of reactive flux do not interlink the complete secondary coil, and that some of the loops interlink only the primary turns, as they fill the coil space as well as the iron circuit surrounding the coils.

Fig. 4 is now presented in an endeavor to show the magnetic flux in its readjustment during the period of sparking, and to especially point out its relative motion across the windings.

In connection with this diagram, it must be understood that all the flux does not move across the windings in a solid band as the diagram tends to show, but that the inside loops tend to pass out first, so that there is a continual thinning out of the loops as they narrow their scope. The general direction for this compound action is as shown by the arrows.

In Fig. 4, the primary reactive flux, which includes the secondary winding, is designated by Φ_p , while the primary reactive flux that does not include the secondary winding is designated by Φ'_p and the secondary reactive flux is shown by Φ_s .

When the primary circuit is interrupted by the breaker, and the condenser takes on its charge, the first loops of primary reactive flux in passing out of existence, followed by some of the lines of retarded excitation flux, sweep across the secondary coil at a high rate of speed and induce the high potential in the secondary winding that causes the "jump" or arc-over at the spark plug. This voltage is therefore produced by the flux motion $\partial(\Phi + \Phi_p) / \partial t$.

Since the secondary circuit has distributed capacity that becomes appreciable at the high potential induced, the electro-magnetic energy represented in the flux motion $\partial(\Phi + \Phi_p) / \partial t$ is transformed to electro-static energy of an amount that can be expressed at any instant by

$$W_c = \frac{C_s (e_s)^2}{2}$$

where C_s represents the distributed capacity of the secondary circuit and e_s the secondary voltage at any instant.

It is this energy suddenly changed to electro-static that has the potential and the electrical inertia that produces the "jump" at the spark plug gap, and starts the high-tension spark proper.

At the instant the "jump" takes place, the secondary dynamic current commences to flow, producing the high-

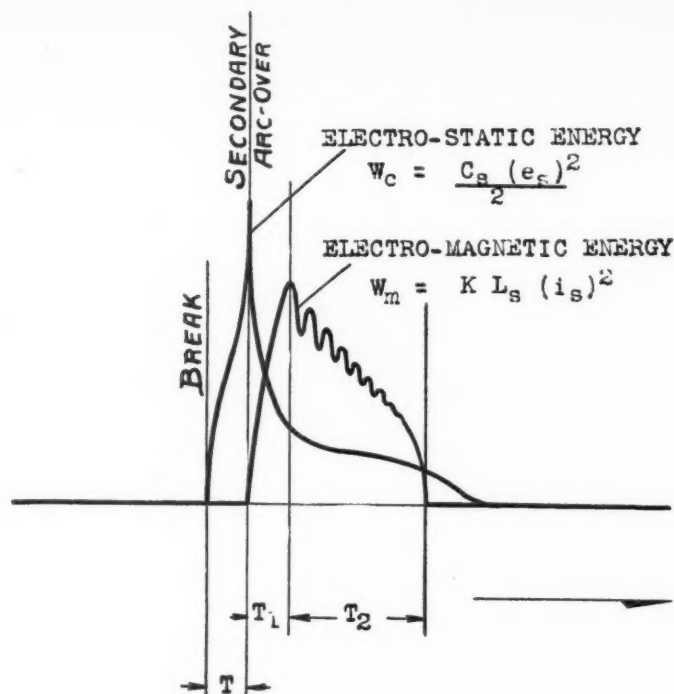


Fig. 5—Electro-static and electro-magnetic components of high-tension spark

tension spark and completing the secondary circuit, so that the secondary coil has an electro-magnetic reaction. This reaction is represented by the loops of flux Φ_s in Fig. 4. As the secondary current increases in amount these loops also increase in number and have a regenerative action on the general flux shift $\partial(\Phi + \Phi_p)/\partial t$ so that during the period of increasing secondary current the flux shift can be expressed by the rate $\partial(\Phi + \Phi_p - \Phi_s)/\partial t$. During this period, the loops of reactive primary flux Φ_p pass out and the loops of secondary reactive flux Φ_s pass in and take their place, meaning that the stored electro-magnetic energy is being transferred from the primary to the secondary circuit.

For the remaining period of sparking, the secondary current decreases and Φ_s also decreases, so that the flux motion can be expressed by $\partial(\Phi + \Phi_s)/\partial t$. This expression covers the period of sparking during which the secondary circuit delivers up its electro-magnetic energy to the spark to produce heat.

This electro-magnetic energy can be expressed by

$$W_m = K L_s (i_s)^2$$

where K is a constant dependent upon the amount of excitation flux combined with the reactive flux for different armature positions, L_s is the secondary inductance and i_s is the secondary dynamic current.

The total energy handled by the secondary circuit during the complete sparking action is seen to be the sum of two components, one electro-static and the other electro-magnetic, and is expressed by

$$W_s = \frac{C_s (e_s)^2}{2} + K L_s (i_s)^2$$

During the above action of flux with respect to the secondary winding, covering transformation, transfer and delivery of most of the energy, the primary reactive flux Φ_p passes out of its interlinkage with the secondary coil, being replaced by Φ_s . In passing out Φ_p decreases in its scope until it interlinks for the most part only with the primary winding and becomes Φ'_p as shown by Fig. 4.

These loops Φ'_p cannot be absorbed by the secondary circuit, and so the energy represented in them is left to charge and discharge from the condenser in an oscillatory

manner, until it is all expended in circuit losses, as was previously pointed out.

The condenser, therefore, acts only as a transformation agent of the system and handles very little of the total energy involved in the sparking phenomena. By handling this energy that is left in the primary circuit, as it does, arcing at the contact points of the breaker is prevented entirely.

This prevention of breaker contact point arcing is one of the most important functions performed by the condenser, for it preserves the life of the contact points.

Spark Characteristics

In order to show more completely the energy characteristics of the high-tension ignition spark, and to point out more clearly the relation existing between the electrical phenomena and the magnetic phenomena producing them during sparking, Fig. 5 is presented. This diagram has the time ordinate during the period T greatly exaggerated. The total period of sparking is divided into three distinctive periods T , T_1 and T_2 , as shown.

T shows the period of time following the primary circuit break during which some of the electro-magnetic energy of the primary circuit is transformed into an electro-static charge in the secondary, due to distributed capacity, at sufficient potential and with sufficient inertia to "jump" the spark gap. In the average magneto this period of time T is about 0.00001 second or less, so that it is evident that the electro-static charge

$$W_c = C_s (e_s)^2 / 2$$

is impressed upon the spark gap at sufficient velocity to insure a high value of inertia.

During the period T_1 following the arc-over at the spark gap, the secondary circuit absorbs the stored energy remaining in the primary circuit, in interlinkage with it and also delivers energy simultaneously to the high tension spark. A maximum value of electro-magnetic energy

$$W_m = K L_s (i_s)^2$$

will exist in the secondary circuit when the secondary spark current reaches its maximum value. During this period it is very important that the secondary circuit under sparking conditions be electrically as alert to receive the energy being transferred from the primary circuit as the primary circuit is to deliver it up.

During the period T_2 the secondary continues to deliver the energy which it has stored to the spark, until the secondary dynamic current drops to zero. The duration of the dynamic spark is therefore T_1 plus T_2 .

These three periods represent, respectively, the periods of transformation, transfer and delivery, and they are produced by the motion of magnetism as tabulated in the diagram.

Conclusions

In order to present a more ready comparison between the phenomena occurring both with and without the condenser, Fig. 6 is presented showing the phenomena under both conditions superimposed one upon the other. In this diagram the curves A and B show the difference between the induced voltages that occur under the two different conditions, showing especially how much quicker the voltage B attains its maximum value following break than does A , and also that the induced voltage B with the condenser in the circuit reaches a higher maximum value; so that it is evident that one of the functions of the condenser is to produce as high a potential per turn in the windings as possible.

The behavior of the current drop following break is directly responsible for the induced voltages according to the laws of induction. Curves C and D show the marked difference in the manner in which the current drops to zero under the two different conditions.

In this connection it might be added that inasmuch as the average value of the induced voltages shown in *A* and *B* will not be very different over the complete life of the spark, the difference in the current drops *C* and *D*, as shown by the shaded area, is a fair criterion of the proportion of the energy that goes into the secondary circuit for the spark and that which is left in the primary circuit for the condenser to handle.

In *AUTOMOTIVE INDUSTRIES*, Vol. XL, page 949, in an article on "Sparking Power of Magnetos," the writer discussed the measurement of the sparking power and spark energy from magnetos of the low tension type by interrupting the generating circuit. The same principles pointed out in that article hold for the measurement of the sparking ability of high tension magnetos, by measuring the primary arcing current and induced voltage during sparking as shown graphically in Fig. 2. The arc power curve of that figure represents the sparking ability of the primary circuit of the high tension magneto. By multiplying the sparking ability of the primary circuit by the percentage, represented in the difference between curves *C* and *D*, divided by the total area enclosed by the curve *C*, the energy content of the high tension ignition spark will be obtained with a fair degree of accuracy.

The curves *E* and *F* show the difference in the amounts and duration of the high tension spark currents as received both with and without the condenser connected, and show also the time relation of the occurrences of the sparks to the time of break.

Summing up the functions performed by the condenser, it is evident that there are four very important results obtained by its use in the high tension magneto. These are as follows:

First—The condenser causes the maximum induced voltage to occur almost immediately upon primary circuit interruption, before the primary circuit can get started arcing at the contact points of the breaker, and thus gets the high tension spark started so quickly that the thus completed secondary circuit will absorb most of the energy.

Second—The condenser causes the maximum possible voltage per turn to be induced in the windings, by discharging the primary current very rapidly, thus reducing the necessary secondary turns to a minimum.

Third—The condenser causes the induced voltage to rise

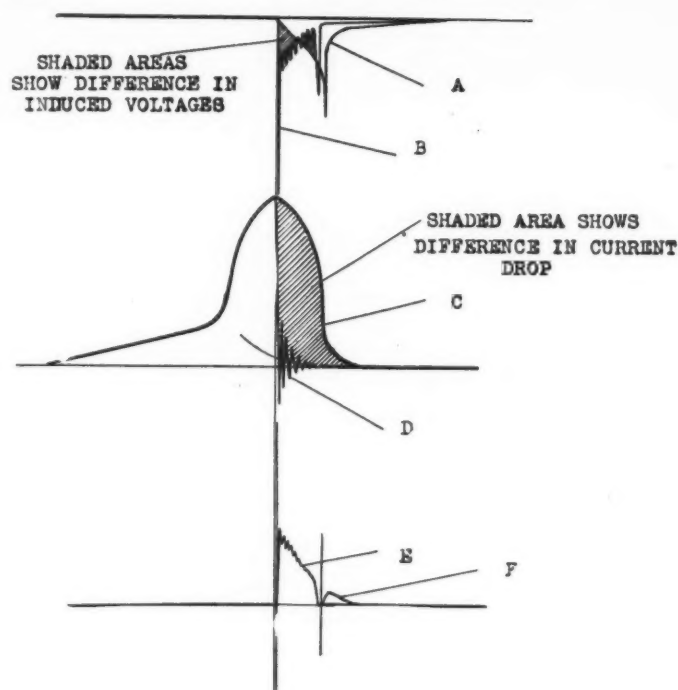


Fig. 6—Comparison of results with and without condenser

to its maximum value so rapidly that the electro-static stress is built up in the secondary circuit with a high value of electrical inertia. The actual electrical potential required is thereby reduced, thus further reducing the number of secondary coil turns necessary.

Fourth—The condenser handles all the energy left in the primary circuit and thereby prevents arcing at the breaker contact points, thus protecting them from burning and pitting.

A survey of these four important functions performed by the condenser shows that the condenser is of vital importance to the success of the induction principle and to the efficiency of a high-tension magneto employing that principle.

New Book on Airplanes

AIRPLANE DESIGN AND CONSTRUCTION. By Ottorino Pomilio. Published by the McGraw-Hill Book Co., New York. 400 pages, 6 x 9 in.; 248 illustrations. Price \$5.

The name of Pomilio is well known in the aircraft industry, as the Pomilio Bros. built up an aircraft plant in Italy, which in the course of the war was taken over by the Ansaldo interests, and later they came to this country and organized the Pomilio Bros. Corporation, which, previous to the signing of the armistice, completed a number of different aircraft models which were submitted for tests to the United States Government.

With such extensive experience in the design of airplanes, the author evidently is well qualified to write on the subject. His book is essentially of the nature of a textbook, dealing with the subject in an analytical way. The entire subject is treated in a very logical manner, the author starting out by defining the functions of each of the principal parts of an airplane, and stating the general laws

of aerodynamics, and then, in subsequent chapters, proceeding to a detailed treatment of the individual parts and a discussion of the laws of flying. The engine is dealt with only from the airplane designer's point of view, and its design is not discussed.

The entire text is divided into four parts, as follows: Part I, Structure of the Airplane; Part II, Elements of Aerodynamics; Part III, Problems of Efficiency, and Part IV, Design of the Airplane. Considerable use is naturally made of mathematics, but all of it is quite simple, and there is absolutely no evidence of equations having been "lugged in." There is also a great deal of tabular material in the volume, relating to the properties of materials and other matters. The calculation of airplanes is illustrated by examples worked out. English weights and measures are used.

It would have been a good plan if some person familiar with English scientific and engineering terminology had looked over the proofs before the book went to press.

What Is the Matter with the British Motor Industry?

It is easy to ask this question, but a large element of the trade has found it very difficult to obtain a satisfactory answer. Here is a discussion of the situation by one of the best informed of automotive publicists in England. He views the situation apparently without prejudice and scolds his own people for "seeing things" and for trying to present their handicap as an advantage in export trade.

LONDON, July 1.

THREE months of the five to elapse before the restriction on motor imports is to be reviewed—the period referred to being from April 1 to September 1—have passed, with little evidence of the production which that measure of protection offered to the home industry was intended to stimulate. People are clamoring for cars on all sides, and, new ones being unobtainable, are competing for all manner of second-hand, and even for junk, vehicles, at prices which set a seal to the folly of the situation.

Under existing conditions it does not seem likely that many new cars will be on the market before the French Show in October, if even at that date. It will be a strange anomaly if the French and other European car makers will be able to promise deliveries of cars before the holding of the Olympia Show in November, especially having regard to the much less favorable state of civil industries in France and Italy at the close of the war in November last.

What is holding back production in British cars seems difficult to find out. Causes alleged are:

Shortness of material in the rough and as stampings and castings, and such finished products as radiators.

Delay of the necessary jigs and dies for stampings, etc.

Lack of special purpose machinery, *e.g.*, there is a dearth of Gleason spiral bevel gear cutters, many of which are on order.

Delay in finishing Government work, which prevents a change over of shops, plants, etc.

Slackness of labor, and unrest generally in the industrial world.

What is not clear is, firstly, why some if not all these sources of delay were not anticipated at the outset, and secondly, granted that they were expected or feared, why British makers insisted on preventing the import of new cars, when it had been clearly indicated that there would be a big demand for cars, which the home market had every reason to anticipate being unable to meet.

It is fairly certain from the now admitted facts that when the war ceased on Nov. 11 there were very few car-makers in Great Britain ready even with a post-war car on paper, and a less number with anything toward realizing a design in the concrete.

A majority of the few makers whose output of cars had been continued during the war for the use of the mili-

tary services were in the same category of unpreparedness, though in these cases it seems that the "hold up" is due to the lack of some special machines, stampings, etc.

As regards the shortage of supplies, it should have been obvious that the needs of other industries would cause congestion at the forges and foundries, and, if so, why was no concerted effort made to get such supplies from the United States?

Apropos of this and the associated causes alleged as the source of the delay in getting British cars on the market, it is understood that one of the weighty reasons that led the Government to continue the embargo on motor car imports was that an influx of cars pending the return of British motor factories to normal conditions would be disastrous to the labor market.

In reply, when challenged by the British interest in imported cars as to whether British makers were prepared to guarantee that such a result would not be the case if the import embargo were continued, no one was daring enough to meet it. The inevitable has followed where the demand is latent and pressing and cannot be satisfied:

(1) Second-hand stuff has soared in price and in some cases over hundreds per cent above the normal rate.

(2) The dealer, for lack of new stuff, has had to take a hand in deals and a trade which does not appeal to the normal trader, most of whom are unfitted for it, and

(3) The high prices have exhausted capital which would and should have been spent on new stuff and much of it saved therein, and has deprived dealers of a legitimate livelihood.

Now, everyone is counting on there being a slump in prices about the fall, when cars are usually laid up. Most of the money spent on these over-rated second-hands, it is believed, are the grants to officers and others on demobilization, the sums ranging from \$500, of which the smaller amounts have gone on motorcycles and the larger sums in cars of all sorts. It needs no argument to show that the capital thus disbursed so extravagantly will not be available for a more remunerative purpose later on, and if production, when once it gets going, is on anything like the lines expected, obviously there will be a glut for lack of buyers, followed by a bad slump in prices all round.

In fact, one of our financial papers this week warns the investors among its readers to realize their motor holdings.

Many people, quite as British minded and saner than the people who succeeded in imposing their fiscal policy on the Government, are anxious as to the stability of the trade under this anticipated slump, and they, at least, are more than ever convinced that it would have been a better policy to have permitted the unrestricted import of cars, even subject to a substantial tariff for revenue purposes, than to have been the means indirectly of forcing up prices of second-hand stuff without a penny levied off it for public benefit.

In effect, we have loaded ourselves with over-rated junk to keep a few thousands of pounds from leaving the country. A few groups of dealers in scrap have reaped a harvest at the expense and to the permanent loss of the nation, already impoverished by the war.

The relaxation of the embargo to the extent of permitting import of five-twelfths of 50 per cent of the 1913 import of cars until Sept. 1, while of little benefit in meeting the public demand for new cars, at least has strengthened the hold and belief in American cars of British dealers and their customers. These cars, imported under a license in the first instance as demonstration cars, have enabled people here to realize the up-to-date quality and marked betterment in appearance of these imported makes.

The prices of these cars, although necessarily somewhat liquid, have been compared with the even more fluctuating list prices of British cars—in prospect—and people have seen that even with a tariff of 33 1/3 per cent the balance is in favor of the American car.

These two factors are slowly leading to much dissatisfaction with affairs, and it is all too likely that by September the public voice will demand a marked modification in the imports policy, for it concerns a great many more necessary public commodities than motor cars. The import of these specimen American cars, it should be added, has embraced half a dozen makes not listed here before the war, and their coming has not meant the cessation of only two makes which were here before the war.

Added to this curious result, there is the certainty that American makers are either concentrating on output in Canada for such of the Colonial and foreign markets as can be supplied through England, or are starting factories and assembling works in Great Britain, which promises a struggle before which all the present—mainly alleged—labor troubles must soon yield.

There is a standing example of the sort of betterment referred to, at Walthamstow, at the A. E. C. truck works. I am never tired of encouraging British motor factory organizers to study the methods and results at these factories catering for the extremes of vehicle types, and I know that many of them have visited these factories referred to, but few of them seem to be able to grasp when and how to begin to reform at home.

When questioned about the matter, the answer is some lurking fear and despair connected with labor and local troubles despite the fact that Manchester and London, where the Ford and A. E. C. factories, respectively, are situated, are two of the strongest centers of organized labor.

No, the fault is not with British labor, or at least solely with British workers, but rather is mainly due to the lack of "courageous and capable organization of output, capable of concentration, attention to the small details of on-costs and able to win and retain the confidence of the workers.

British labor troubles, at least nine-tenths of them in normal circumstances, can be traced to suspicions

engendered by some paltry cause, such as disturbing a settled piece-work price, or the employment as charge hands of persons incompetent for handling men.

Repeated evidence of the fact is the result that invariably follows a labor dispute here, namely, it is the employers who yield rather than the men, and when the cause of the dispute comes to be reviewed, perhaps after a long interval, one wonders how such an issue ever came to be raised.

As to India

As a recent instance of the curious purview of some responsible for British motor trade there is an account of a recent interview between an Indian press representative and Major Goddard, the newly appointed representative of the interests of the British motor trade sent out by the Government acting in alliance with the British and Allied Motor Manufacturers. The italics are mine.

During the interview Major Goddard remarked that the difficulty in India to-day seemed to be the American "invasion," which appeared to be alarming some people to a considerable degree.

While admitting the many excellent qualities of the American car, he said that *every British car possessed an individuality in each nut and bolt which the American car, being a standardized production from start to finish, could never claim—in fact, there is generally nothing to identify one American car of the same make from another beyond its own number.*

The real root of the difficulties with which the British manufacturer *has to contend when competing with America was the great scarcity combined with the great price of raw material, and also the labor costs.* These two things have chiefly contributed to the discomfiture of the British maker during the war, together, of course, with the transport problem, which has made it well-nigh impossible to ship any car out of England since 1914, and thereby profited the American manufacturers to such an extent that *they have been able to establish themselves wherever they care to.*

With regard to future deliveries of British post-war models, Major Goddard said he hoped these would start about July, and he had done his best to convince manufacturers at home of the necessity of delivering at least a few chassis at the earliest opportunity in order to compete with the increasing number of American chassis now being imported.

The vital question of spare parts for British cars in India was receiving the attention of manufacturers, and in a short time a central depot, run under the auspices of home manufacturers, would hold stocks for all British vehicles in use in the neighborhood, and upon which agents could draw.

A more formidable group of illogical statements and shallow apologies could hardly be found than the foregoing.

Apparently Major Goddard is blind to the fact that the very blemish of standardization in his eyes is the value and strength of the American production in the Indian market. Apparently he prefers that British cars should continue to be divergent from each other of a common model, even to what he styles the "individuality" of their bolts and nuts, than that they should be built on commercial lines, cheap to run and maintain, and "held up" for spares to a minimum extent of delay.

Major Goddard appears not to know that material and

labor are on the whole more costly in the United States than in England. The saving to the advantage of America is in the more economical handling of the material, which enables the actual cost of American labor to be relatively lower than in England. This benefit is reflected all through the production and influences the price of spares, both as regards the cost of production and handling through the dealers.

For the last three years of the war there was a strict restraint of motor imports from America to British India due to the direct action of the Indian Government and the shortage of shipping, which he appears to think concerned only the export of British cars. Moreover, America was in a fair way of gripping the Indian and neigh-

boring Eastern markets before the world war started.

Major Goddard is hopeful that cars will begin to reach India "about" July. On this estimate the shipments of those cars must now be starting or en route, but my information is quite to the contrary, excepting at most three makes of cars, which are not post-war models at all.

Major Goddard's last reference—"to improved facilities for spares"—is the only hopeful passage in this interview, but even the means outlined—a central depot run as a sort of Motor Noah's Ark—falls short of both the need of the situation and the standard practice of the American trade in British possessions, where every importing house has both a central and branch stores, kept stocked and organized on the lines of the parent factory.

Leaf-Spring Covers

AN automobile appliance that seems to have met with considerable favor in England in recent years is the leaf-spring cover, which permits of effective interleaf lubrication. We have used other spring-lubricating means in this country, most of which are considerably less expensive than a set of leather gaiters, but it is not beyond the range of possibility that for high-class cars the leather spring cover will find a market here in course of time.



Various forms of leaf-spring covers

The accompanying cut illustrates the Wilcot leaf-spring cover made in England. It is arranged to cover the entire spring, including the ends, there being neat extension pieces with flap-ends, the whole folding in symmetrically and being locked by a wrist strap. The mode of fastening these covers insures a perfect glove-tight fit, because each pair or section of the seamed edges is free to respond to any local requirement, and, being without a soaking-pad, tends further to secure a glove-tight fit. Before fitting, it is intended that the spring leaves be cleaned and lubricated either with grease or some preparation of graphite.

Torque Recoil

By Lawrence H. Pomeroy

LIKE the giant in the old English pantomime, I smell the blood of an Englishman in your editorial of July 3 referring to my paper on Torque Recoil and Car Weight, read at Ottawa Beach. If my surmise is correct, I make no apologies for what follows. If it is not, your contributor will, I hope, acquit me of any attempt to wound the feelings of an American critic.

Torque reaction and torque recoil are, in my view, synonymous terms, just as correctly applied to engines with one cylinder as with a dozen. Your contributor confuses an already subtle issue by making a distinction between them. He probably means that torque reaction expresses the reaction due to the average torque, while torque recoil is a term applying to the variation of the torque reaction which arises from the causes pointed out in my paper.

Torque recoil or torque reaction, whichever one likes to term it, is only objectionable due to its periodicity. This periodicity and the effects arising from it were the subject matter of my paper. Your contributor misses, however, the main point, that it is not on the difference between the maximum and minimum values of the crankshaft torque *per se* that the torque recoil effect, as affecting the senses, depends, but upon the periodicity also, and that, given a high enough speed, a single cylinder engine will produce an apparently continuous torque recoil effect just as well as a twelve cylinder at a lower speed.

The analogy between torque recoil effect and the periodicity required for an alternating electric current to produce apparently continuous illumination has been pointed out in your columns before. I cannot agree that the fact that the impulses overlap in engines with more than four cylinders should be credited with anything like its face value.

The lack of rigidity of the normal engine mounting and the inertia effect of the mass of the engine itself, to say nothing of the torque recoil effect due to the piston inertia, tend to make it a vain thing to consider torque recoil other than as a product of the magnitude of the torque and the number of impulses per unit time which create this torque. So far as the senses are concerned, there is no appreciable difference in the torque recoil effect of a four-cylinder engine running at 600 r.p.m. and a six-cylinder running at 400 r.p.m., each delivering the same horsepower.

Torque recoil is only objectionable when noticed—like most evil things—and the object of my paper was to show that, comparing four-cylinder engines with those of a larger number, torque recoil as affecting the feelings of the passenger depended for its noticeability upon the factors therein described and that in fact an equally good case could be made out for all types of engines in terms of the total weight of the car, or the duty required.

Help to Take the Kinks Out of International Parcel Post

Export selling by parcel post is not entirely satisfactory, but it can be made so, if the exporters will give their assistance to the post office and other departments that have this matter in charge. The possibilities of this sort of shipment are great. Mr. Plaza tells of shipping 300 maximum weight packages to one customer at one time. Think this over. Then classify your troubles with the existing laws and set about patiently and determinedly to have them corrected.

THE customs duties and custom house regulations are the most important problems in parcel post service between the United States and Pan-American countries. Rulings prevalent in the Pan-American countries are detrimental to the proper development of trade and in order to have a really serviceable, economical medium of shipping merchandise by mail, it is necessary for the Latin-American countries to co-operate with the United States to eliminate the annoying petty obstacles that makes a poor imitation of the present service in place of a real constructive system.

These were the views stated by F. T. Plaza of the Export Department of Montgomery Ward & Co., at the recent Pan-American Convention at Washington.

Parcel post is to-day more than ever the quickest and most economical medium of obtaining light weight merchandise from the sources of supply, not only in the United States but in most of the nations of North, Central and South America, said Plaza. It is the method of shipment employed not only by houses dealing directly with the consumer, but also by those dealing with merchants and importers. It is especially convenient for shipment of small orders and repair parts and it has, therefore, become a matter of intense interest to concerns indulging in international trade regardless of their particular line of business and methods of selling.

"It is due to the steady efforts of our postoffice," he said, "that we have parcel post to-day with every republic of the Pan-American Union. This has placed our exporters in the same favorable position as those of the European nations and has brought about what may be called the complete establishment of a Pan-American parcel post, opening a new way—heretofore but little known—for the interchange of commodities between the republics of the American continent.

"Let us consider some phases of the arrangements whereby packages may be exchanged by mail between the United States and countries of Pan-America and discuss the changes that are necessary for their improvement:

- 1—Limit of weight.
- 2—Postage rates.
- 3—Packing.
- 4—Necessary documents.
- 5—Suggestions for its improvement.

"At present we have four different limits of weight for a parcel, each depending on the country of destination. To Colombia, Brazil, Peru, Guatemala, Honduras and Nicaragua the limit of weight for a parcel is 22 lb.; to Ecuador, Mexico, Panama and El Salvador, 20 lb.; to the Dominican Republic, Haiti, Venezuela, Bolivia,

Chile, Argentina, Brazil, Uruguay and Paraguay, 11 lb.; to Cuba, 4 lb. 6 oz.

"Exporters by parcel post should bear in mind that the limits of weight are not the same for all countries so that they may take full advantage of the maximum weight whenever possible. Many people are under the impression that the limit of weight is uniformly 11 lb., and I know of some instances where shipments have been unnecessarily divided or goods needlessly omitted.

"The item of packing is of vital importance in the successful operation of parcel post. This is especially true with respect to certain countries of Pan-America. To pack the goods properly and economically the shipper must be acquainted not only with the local conditions of transportation but also with the climate.

"I remember one case especially well where we sent an order to one of our customers living in a small town in the eastern part of Bolivia near the Brazilian border, made up of 300 packages of 11 lb. each, and after a trip of thousands of miles over water routes and mountain trails the goods arrived in perfect condition—not a single item missing, not a single item damaged. Just as if they had been shipped from Washington to Philadelphia.

"Now let us consider what documents are necessary for shipment by parcel post to the republics of Pan-America. With the exception of Cuba, Nicaragua and Chile, there is no need of any consular documents, as the duty is collected according to the weight and valuation shown on the tag that is attached to the parcel, known as the customs declaration, or according to the ordinary commercial invoice. To Chile the consular invoice is necessary when the shipment amounts to \$25 or more; to Nicaragua when the amount is \$50 or more. These documents are obtainable in the same form and manner as apply to ordinary freight shipments.

"The Republic of Cuba requires that shipments of \$5 or more be covered by a consular invoice, duly certified by a Cuban consul. If this item is overlooked by the shipper, a fine is imposed by the Cuban Custom House authorities on the goods received.

"It seems that during this distinguished gathering in which there are so many representatives of the Pan-American nations, it will be the opportune time to make some suggestions that in our opinion, derived from every day experience, are necessary to make Pan-American parcel post more serviceable and competent. We have had abundant evidence recently that such suggestions will receive the fullest consideration of the United States Post Office Department, and there is every reason to believe that the Postal Administrations of the Re-

publics of Central and South America will lend the maximum co-operation.

"As mentioned before, the limit of weight for parcels varies from 4 lb. 6 oz. to 22 lb., according to the country of destination. The Pan-American parcel post should have, in our opinion, one standard limit of weight—let us say 22 lb.—with the limit of measurements increased in proportion. The increased weight of parcels will bring benefits to both the exporter and the importer. One registration fee will suffice where two are now required. It will very materially decrease the chances of loss that are always incurred when goods have to go in many parcels instead of one or two.

"There is no doubt but that by increasing the weight, parcel post will become more useful and more popular. This has been proven by experience in our own business, in those countries where the limit was raised from 11 lb. to 20 lb. some time ago.

"Postage is another item that no doubt can be improved. The parcel post treaty between this country and the other Pan-American republics calls for one standard rate of postage of 12 cents per pound or fraction thereof. England employs a much better system of charges. In her parcel post she uses the group system of postage—from 1 to 3 lb. and from 7 to 11 lb.—the heavier the package, the less the rate of postage. This in itself, you can very easily see, is a great incentive to shippers and buyers to increase the size of their parcels and orders.

"At present there is no provision for the sending of parcels C. O. D. This is especially needed to places in Central and South America where the facilities for sending small remittances are inadequate, or in some cases do not exist at all. Besides, Latin-American buyers would much prefer to pay for the price of the goods and transportation charges at the time of delivery of the goods rather than to send the money in advance.

"It would be a great thing, therefore, for the parcel post if the United States postal authorities and those of the rest of the Pan-American republics could get together and formulate C. O. D. arrangements. This would add greatly to the full development of this important medium of trade.

"I am now going to touch on a subject of extreme importance—a subject which I believe has been at some time or other a nightmare to more than one exporter. This is the matter of Custom's duties and Custom House regulations. This conference has been called the Pan-American Commercial Conference. I consider myself then as in regular family reunion, in which we are to discuss our problems with the utmost frankness. Do not consider then what I am about to say as mere criticism, but as constructive criticism; it is the only criticism that will make such conferences as this of real benefit.

"Unless the Custom House regulations are made easier in each one of the Pan-American Republics, the parcel post to many people will be only an empty name. It will be used by the few and not by the many to whom it is really supposed to bring the largest benefit. Complicated Custom House regulations may easily defeat the purpose for which the parcel post was established. Nothing, in my judgment, is gained by making Custom House regulations complicated instead of simple. I am a Latin-American myself and have had discussions on this subject with Government officials, private individuals and importers of many of the Pan-American nations and without a single exception they have all agreed with me.

"There is no question in my mind but that the revenue to each government could be increased very materially by simplifying the Custom House requirements, as this would encourage many people to sell and many people to buy that at present are rather reluctant because of the obstacles of the present-day regulations.

"Such a ruling as that prevalent in Colombia—that if articles dutiable under different tariff classifications are mailed in the same parcel they are all dutiable at the rate applicable to the article paying the highest rate—cannot be, if I may be allowed to say, but detrimental to the proper development of Pan-American trade. This ruling is an obstacle to the advantage gained by the recent increase of weight for parcels from 11 to 22 lb., for if a merchant has to ship to Colombia half a dozen items of merchandise of different classifications, rather than run the chance of making his customer pay an excessive amount of duty, he packs the goods in six different packages instead of only one.

"And this is not the only case. In some countries duty is collected on the gross weight of the package and an exporter, especially to the interior towns, finds himself very often in the predicament of not knowing just what to do. On the one hand, the customer demands that the merchandise must be securely packed so as to insure its safe arrival. On the other hand, he also asks that the packing should be as light as possible so the duty will not be out of proportion to the value of the goods ordered. Trying to serve the customer in both cases, the exporter generally finds that he has failed to do either. This often results in a dissatisfied customer and a skeptical exporter.

"In Venezuela also, according to a decree of Sept. 26, 1918, wrapping such as cloth, straw and paper used for outer covering will be dutiable at the rate of a little more than 3 cents per pound. The decree also calls for a special Custom House charge of 29 cents for each parcel imported from the United States when parcels coming from other countries are only charged 5 cents. Failure to specify the goods according to the custom tariff will subject the importer to a fine of 15 per cent of the custom duty.

"In others, such as Costa Rica and the Argentine Republic, we have found that the surtax placed on the importation of merchandise by parcel post is so out of proportion, especially on small shipments, to the total value that in most cases it makes the transaction anything but economical to the purchaser.

"Besides this question of duty there is another important drawback against the extension of the parcel post in Pan-America. In such countries as Brazil, parcel post packages can only be sent to a limited number of post offices, and if the purchaser happens to live outside of the favored cities, which are few in number, he has to make use of the services of an agent for the forwarding of his goods. Certainly this is not an encouraging feature in popularizing the use of the parcel post.

"There is not the slightest question that something should be done and done quickly in this matter; it is inconceivable that there is no parcel post between the United States and Cuba except a makeshift arrangement for carrying parcels weighing up to 4 lb. 6 oz., while European countries have arrangements whereby 11 lb. may be sent in one parcel—putting us therefore at a great disadvantage in the matter of trade by mail. This is one of the cases in which a favorable decision by this Government will be of benefit both to the United States and Cuban citizens."

Selling the Worker an Interest in the Business

Every intelligent manufacturer is to-day thinking of the industrial movement and hoping that a solution will appear from somewhere or anywhere. A good many employers are making mental notes of recent failures to make profit sharing and similar schemes operative. But they are not making note of the cause of these failures. This constructive article by Mr. Tipper inferentially explains a good many failures by indicating the method for success

By Harry Tipper

IN introducing the individual worker, who has shown potential capacity for promotion, to a new and more responsible job, every employer of labor is prepared for a number of mistakes on the part of such worker and the investment of a certain amount of time and effort in training such a worker up to the point where his technical knowledge and experience will equal his potential capacity.

This is constantly being done and in some organizations it is possible to determine with a fair degree of accuracy the amount of money which must be invested in order to create a skilled mechanic, a new salesman, a foreman, superintendent and a manager. No shrewd business man expects that the man who is promoted, however capable he may be potentially and however valuable he may become, will be able to slip into the new job and average the right results without any trouble or investment, or without any time and labor spent on his training.

Labor, by dint of organization, has secured through its leaders a voice in the affairs of industry in a general way and has acquired sufficient power to make bargaining with it a necessity. Things have reached the stage in this respect which make it necessary for the far-sighted organization to consider plans whereby the employees can have some voice in matters concerning their own conditions of employment.

While the leader of the labor union has had some opportunity of acquiring the knowledge that is necessary for the collective bargaining which has been his principal occupation, the individual workman has had no opportunity of acquiring the information which must parallel his new responsibilities.

The manufacturer of to-day must be prepared to spend time and labor in the education of the worker in regard to the matters that will come under his observation in connection with his new responsibilities. He must be prepared to see mistakes made in the carrying out of those responsibilities, until the workers themselves have acquired the experience that will entirely fit them for the new type of work.

But this is not only true in respect of the workers who will represent their fellow workers upon the joint council and the other workers who will control those representatives by their votes. It is also the case with the

departmental heads who are appointed by the manufacturer to represent him in the councils of legislation necessary for the growth of the business.

These departmental heads, or executives, have received an efficient training in their specialized duties, but most of them have had little or no opportunity to obtain a general understanding of the various departments of the business and the co-ordination and co-operation which must be exercised in order that these departments shall work smoothly together. For that reason the new systems which are being adopted day by day by additional manufacturers will call for new qualities in the executives, for new experience and new training, none of which can be accumulated over night and some of which will only be accumulated after a due proportion of mistakes have been made.

It is a curious thing that while the average man will go to an expert when his health goes wrong, will admit that he knows nothing about geology and refer you to a musician for information on music, he is perfectly prepared to answer you without hesitation as to principles of government and human organization, without ever having spent one half hour in the whole course of his life in the study of that subject.

It is because this condition exists that it becomes so necessary to emphasize the time and labor which must be spent in accumulating the new kind of experience and wisdom necessary to govern the industrial machinery in the future. It is for this reason that the present governors of industry must be prepared to see their new partners in the government of business make a lot of mistakes and propose a lot of experiments that do not appear to be reasonable.

At the same time these present governors of industry must recognize the fact that they have spent so little time, themselves, upon the study of the human factor that they are not overly informed upon the subject, and may be mistaken in their prejudices and their conclusions.

In human affairs, perhaps, there is less difference between the capacity of the poorest paid employee and the capacity of the highest paid executive than in any other branch of endeavor. I have not infrequently observed

the night watchman, the railroad conductor and other type of semi-skilled or unskilled labor, to be thoroughly successful in controlling the politics of a ward, the operations of a lodge or the conduct of a labor organization. Such men control such matters because they are either instinctively or deliberately versed in human affairs to a degree.

While, therefore, a great many mistakes will be made in the transition of a small amount of power to the workers within the industrial organization, and while mistakes will be made by the executives who must add to their specialized knowledge a knowledge of general conditions, nevertheless it is within the bounds of possibility, and indeed it is highly probable that the manufacturer will discover qualities of leadership and understanding in connection with the human side where he has not been accustomed to look for them and where he has less suspected their existence.

After all the most important factors in industrial organization at the present time are:

- (1) The provision of orderly means for the expression of grievances and differences of opinion upon those general matters which are of importance to all members of the organization and
- (2) A decent measure of understanding common to all members of the organization concerning purposes, obligations, and necessities of the organization as an economic body.

These two matters can be provided for only by discussion under orderly plans and education undertaken with similar wisdom. The various plans of organization which bring the workman into responsibility in respect of the condition governing his working hours, wages, etc., provide an avenue for the discussion and the educational work, which has been established by many concerns, provides an avenue for the understanding. This educational work must be made interesting and continuous in order to fulfill its purpose and for that reason it should be in charge of those men in the organization who are most familiar with the methods of presentation, with making a subject interesting and appealing to any body of people.

Defects in Organization Plans

We have mentioned before the defects that have arisen in connection with new organization plans, where such plans have been left to men who have had little practice in the presentation of facts in an interesting way and one which can be readily interpreted. In many organizations the promotion of the new plans has been left to the legal department, or to the production department, and their efforts at promotion have been what might be expected. They have been so arranged as to be of little interest to the general worker and sufficiently involved in their language as to be interpreted only with difficulty.

It is the marketing side of the average business which has acquired by long experience the art of presenting a subject in an interesting and appealing manner, and it is the marketing side of the business, either the sales or the advertising heads, who should be in charge of the responsibility of promoting organization and educational plans, and of making the organization and educational matter of interest to the employee.

When a suspicion exists between the manufacturer and a customer, as a result of a supposed injustice or grievance, the man who is called upon to settle that grievance and remove the suspicion is the man who is tactful, interesting, capable of seeing the other fellow's side and at the same time capable of settling the matter without weakness. He usually comes from the market-

ing end of the business, because that end of the business has been constantly in contact with the outside world and continually enforces its arguments upon others by persuasion and interest.

The laborer in the factory is just as necessary to the manufacturer as the customer outside. His opinions exercise a considerable influence in his circle in the labor ranks. His vote has a great deal to do with the governmental platforms and activities. His opinions affect all his actions in connection with his work.

The suspicion with which he regards the manufacturer's actions is a thousand times deeper than any suspicion which the customer may have from minor difficulties. It is so deep that it affects the incentive for work, the efficiency of his operations and his whole attitude toward the labor and capital conflict.

In order to develop a unity of purpose within the organization, this suspicion must be cleared away.

No statement of given intention will be of any value in attempting to clear this away.

No mere recital of organization plan and no mere schedule of benefits so-called will count for anything in the face of such an attitude.

Requires Intelligent Promotion Work

It must be laboriously and intelligently conducted by interesting and truthful statements calculated to show the reasons for organization development, the necessities of the company, the validity of its policy and what it hopes to do with its future arrangements. This laborious and intelligent promotion requires an ability to see the other man's point of view and an experience in the presentation of facts, which is rarely possessed by either the legal or manufacturing executives, but which is the very heart of the requirement for marketing and which in greater or lesser degree must be possessed by all sales and advertising heads.

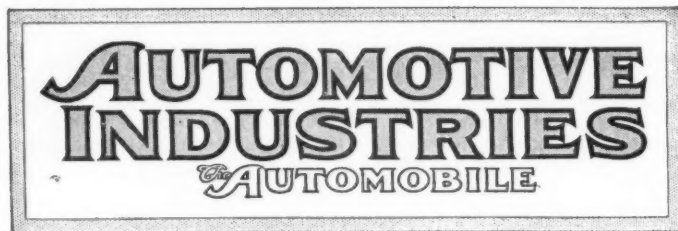
The manufacturer who desires to have some measure of harmonious development within his industrial organization will be obliged to give his attention to the education of his workers on economic matters and to the development of their responsibility in connection with their wages, hours and working conditions.

In attempting this task he should use, for his own benefit, the talent which he possesses in his organization in the marketing departments of the business, so that the time and labor that are necessary may be conserved and the mistakes which must necessarily grow out of the changes will be limited in their number and minor in their character.

It may be necessary to have the legal department draw up the constitution or plan of organization, although the legal terminology is always bewildering to the layman's mind, but it is not necessary to have the promotion matter passed through that department and it is of great importance that it should be submitted to men who are more expert in their knowledge of other people and how to present matters to them.

New Spark Plug Insulator

A PATENT has recently been issued to Charles K. Harding, of Chicago, for an electric spark plug, in which is described a new insulating material for spark plugs, composed exclusively of neutral tri-valent and tetra-valent earth oxides, such as lathanium, thorium, zirconium and didymium. These materials are said to yield an insulator of the desired density and great mechanical strength.



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Automotive Industries—The Automobile is a consolidation of The Automobile (monthly) and the Motor Review (weekly), May, 1902, Dealer and Repairman (monthly), October, 1903, and the Automobile Magazine (monthly), July, 1907, and The Horseless Age (semi-monthly) May, 1918.

Lifting the Veil

THERE has been much mystery as to the mechanical achievements of interest to the automotive industry in the war operations. This mystery is due to two causes: First, that during a war all developments are more or less secretive; second, that there was not time to write engineering stories of these things as they happened.

Following the war, the men who did these things in the field were anxious to get back to home affairs and most of them left the service without sufficient data to write of what they had accomplished. But with the flurry of peace-making over, the situation is different and there is coming into print much that is of interest and of importance to the industry.

Recently AUTOMOTIVE INDUSTRIES printed a description of the Napier truck, the first after-the-war design of an important British manufacturer. This is more than an ordinary truck design, for into this vehicle the designer has put as much as possible of the lessons of war transportation as he could. That is a natural sequence. The description must be considered with this idea foremost. The same is true of

the recent story of the French Bignan car, a description of which was supplied to this publication by W. F. Bradley, its European correspondent. Foreign factories are having much trouble getting back into production and their output for some time will be limited, hence it is only natural that they should put their best into the type of vehicle offered.

But there is more coming, and notable among these is the series of articles beginning in this issue by Lieut.-Col. Arthur J. Slade on German trucks. In the future there will be more descriptions of French and British cars and trucks. The unique Enfield-All-day is on the program for the very near future. This is a very remarkable car of which little actually has been told in this country.

Then there is the work of the A. E. F. Already we have referred to a forthcoming article on trailers used by the A. E. F., a highly interesting and informative article prepared by Mr. Bradley. He also has prepared an article on the use of "Portable Searchlight Equipment" by the A. E. F. These searchlights in themselves are an interesting topic, and the means of transporting them to the most useful point is another phase. There will be a big field for this portable electric-light plant in many industries. It was developed to a high point of perfection in the American army.

There is much more in the foreign field that will be of value to the American manufacturer, who now is inclined to say with Monte Cristo, "The world is mine," but who must not forget that, in entering this new field, he has rivals that he never before has considered. Perhaps the American, being far from the field of the actual war, has missed some lesson that has been driven home with his foreign competitor who was a roadside observer.

The Nature of Friction

IN our college days we were taught that friction between two surfaces in contact is due to the fact that the protuberances of the one surface engage into the depression of the other, and in moving one surface over the other under pressure the protuberances must be either bent over or torn off. According to Dr. Hele Shaw, who recently delivered a lecture on "Clutches" before the Royal Institution, it is now believed that when two surfaces are in contact a certain number of particles on the surfaces actually touch each other, and that the friction effect is due to the attractive force existing between these particles. If, of course, very rough surfaces are rubbed over one another, bits are knocked out and more work is done; but this is not true friction, which is now believed to be due to the mutual attraction of particles of matter. It is generally known that this attraction can be shown directly if true surfaces are placed in contact. For instance, eleven copper cubes, the whole weighing 98 grammes, could be made to hang one from another in a vertical string. This phenomenon is not due to any sucker effect, but is to be explained purely by molecular attraction. Laplace calculated that this effect could not be detected over a greater distance than 5×10^{-7} cms., which is about 1/2,000,000 in.

Your Own Interest

THE railroad question again is acute and something must be done without delay. How many manufacturers are holding aloof and acting as though this was not their job?

If it is not the manufacturer's job to solve the railroad problem, whose job is it? To whom is a railroad of more value than to the producer? Of what use is a factory without transportation? If the automotive industry does not need railroads, why did it go back to them after the experience with driveways? Can anybody give a good reason why the producers of this country should not interest themselves in the settlement of the transportation problems now acute?

National Budget

SOME time ago a bill was introduced in Congress with the object of creating a budget making body to govern the question of the financial expenditure necessary to run the Government of the United States. Under the conditions which have been left over from the war, with the necessity for new expenditures and with the continuance of abnormally large expenditures as a result of the reconstruction necessities, it is very easy for the Government of the United States to appropriate money for various departments without regard to the amount of income which will be available and with no decent co-ordination of the needs of those departments, so that no one department will be hampered in its work and no other department lavishly supplied in proportion to its necessities. It is probable that there will be a call for Government ruling in the near future and there may be a distinct demand for some means, even though they are artificial means, of militating the effect of the high cost of living. All these things spell unusual expenditure on the part of the Government in attempting to meet the problems, and unless some budget system is introduced both the method of securing and of expending the income will be unwise and without the proper measure of co-ordination and justice.

The manufacturer is deeply interested because of the large part which taxes play and because of the effect of general taxation upon the buying power of the population. It will be wise for the manufacturer to take a deep interest in the fate of these bills and to express his interest in such volume and with sufficient definiteness so that the representatives in Congress are impressed with the necessity for carrying out something of this kind.

Our Biggest Foreign Trade Year

THE foreign trade figures for the last year form an interesting study, aside from the fact that they are the largest totals this country has ever made. One of the extremely interesting points is that our export of manufactures goes above that of the export of foodstuffs, setting aside the old theory that this country was an export nation merely because it produced more food than it consumed.

For the year ended with June the exports of manufactures totaled about \$3,250,000,000, while the food-stuff total was only \$2,500,000,000 and the manufacturing materials \$1,250,000,000. These figures are necessarily approximations, as the official totals have not yet been compiled; but they are sufficiently accurate to show the new position assumed by this country.

In the matter of imports, there also is a realignment, as raw materials for manufacture comprise the largest division of the imports. Finished manufactures, which usually form about 24 per cent of the total, last year formed only about 15 per cent. One reason for this will be seen in the fact that the European factories, which formerly supplied most of the finished goods imported into this country, are not in production, at least not production for foreign trade. Concerning the foreign trade situation at the close of the last fiscal year, as shown by the estimated annual figures, The National City Bank of New York says:

"The exact record of this remarkable year in our trade was: Imports \$3,096,000,000, against the former high record of \$2,945,655,000 in 1918; exports \$7,226,320,000, against the former high record of \$6,290,048,000 in 1917; the grand total \$10,322,460,000, against the former high record of \$8,949,404,000 in 1917. The excess of exports over imports, or 'favorable trade balance,' was \$4,12,000,000, against \$3,630,629,000 in the former high record year of 1917. The favorable trade balance in the five years since the beginning of the war is greater than in the 125 years preceding the war. The gold imports in the past 5 years aggregated \$1,823,000,000 and the gold exports \$785,000,000, making the net importation of gold in the 5 years \$1,038,000,000. The excess of exports of merchandise in the same 5 year period was \$13,963,000,000, this difference between net exports of merchandise and net imports of gold being largely offset by the government's credits of \$10,000,000,000 to our European Allies."

Credit and Exchange

THE importance of the price of exchange to export business is made plain in an announcement from the American Chamber of Commerce in London. This is to the effect that the British Treasury has arranged that three renewals can be made of 90 day bills for merchandise sold to Italy. This action was taken, it is stated, not so much because Italy needs the extended credit, but to permit Italian customers to await the time when exchange rates will be more favorable to them. The result is practically a year's credit to the Italian purchaser. How many American exporters are interesting themselves in this phase of merchandising?

RECENT reports are that Iowa farms have been sold at prices exceeding \$400 an acre. This price is not general, but several such sales are on record. But the interesting point is that Iowa bankers are discouraging these prices. They have let it be known that they consider \$300 an acre the top price for Iowa land with a view of future profits.

Associations Unite To Study Trucks

S. A. E., N. A. C. C. and M. & A.
M. A. Co-operate in Investiga-
tion of Captured German
Vehicles

NEW YORK, Aug. 6—Forty-seven makes of German trucks brought to this country as captured war material will be objects of a research investigation to be conducted jointly by the Society of Automotive Engineers, the National Automobile Chamber of Commerce and the Motor and Accessory Manufacturers' Association.

The construction and performance characteristics of the Teuton vehicles will be made available to American manufacturers through a report analyzing them. Possibly some of the parts will be sent to factories for more minute study, and reports of them made to the Motor Transport Corps and to the industry in general.

The investigation will be in charge of L. P. Kalb of the Standard Parts Co., chairman of the truck standards division of the S. A. E. standards committee, and a major in the Motor Transport Corps during the war. In the latter capacity Kalb took a leading part in standardizing the American army truck.

Kalb went to Washington last week to lay the plans for the investigation, conferring with Motor Transport officials and looking over the trucks, which were assembled by Lieut. Col. A. J. Slade of the Armistice Commission from 1250 vehicles turned over to the United States by Germany under the armistice terms. Slade shipped them here as being the best available specimens of German truck construction.

Investigation Profitable to Industry

The Motor Transport Corps felt that a study of the trucks would profit both the industry and the Government, and suggested the investigation in a communication to the three associations which contained the following paragraphs:

"It will probably be desirable to determine the performance characteristics of some of the vehicles. This matter is now being studied, but it is suggested that a short road test be made on each truck, in order to determine the fuel consumption per mile and per ton mile. It is hoped also to make arrangements so that tests will be made of the typical engines, steering gear, transmissions, rear axles and brakes.

"It is believed also that some samples should be taken of the more important parts of each unit for the purpose of chemical analysis. It may be possible to determine the physical properties of some of these parts. If it can be obtained, the complete transmission efficiency, engine to rear wheels, will be valuable. It is believed that such a measurement will be more useful than the drawbar pull. Most of the German

trucks, of course, are fitted with steel tires so that any drawbar measurements would not be comparable with American practice.

"After a general study has been made of the truck, it has been suggested that some of the important parts be lent to manufacturers who might make a closer study of such parts as the engine, carbureter, transmission and magneto. It is possible that such an arrangement might be worked out with the understanding that a complete report of each study was to be made available to the Motor Transport Corps and to the industry in general."

Buick Reduces Prices on Parts

FLINT, Aug. 4—The Buick Motor Car Co. has just made a reduction in the price of spare parts. This is due to improved manufacturing facilities, the establishing of repair parts stocks among dealers, and the purchasing of raw materials in large quantities.

The price reduction on some of the parts range from 15 to 35 per cent. The Buick company manufactures its parts in separate plants built for the purpose and independent of the main automobile plant.

AKRON BUILDING HOMES

AKRON, Aug. 5—H. S. Firestone heads a corporation that is to spend \$5,000,000 here to relieve housing congestion. It is proposed to build 5000 houses, capable of housing 20,000 persons within a few weeks.

Statistics of the rubber factories estimate 6000 Akron workers with families living elsewhere. It is thought that most of these workers would bring their families here if houses could be provided. The corporation just formed will rent at reasonable rates, and will finance workmen who have land and want to build.

ERECT DWELLINGS

JEANETTE, PA., Aug. 5—The Pennsylvania Rubber Co. has purchased 120 acres of land near its plant on which will be erected 600 modern stucco houses for employees. The dwellings, which it is said are not to be of the factory type, will be sold to workers on liberal terms.

HERBRAND DOUBLING CAPACITY

FREMONT, OHIO, Aug. 4—The Herbrand Co. has just purchased a 35-acre tract of land on the outskirts of the city on which it will build a plant. Its present establishment is overcrowded. In addition to the plant, a new clubhouse will be built. The company is making drop forgings for a number of automobile firms. It employs 500 men. This force will be doubled when the new plant is built.

HOOVER BALL DECLARES DIVIDEND

The Hoover Steel Ball Co., Ann Arbor, Mich., stock dividend paid, 2 per cent on June earnings.

Detroit Industry Is At High Mark

Not Only Automobile Factories,
but Building Has Boom—
Labor Is Scarce

DETROIT, Aug. 3—Nearly 90 per cent of Detroit business is now normal or above normal. Never were more men employed in the shops and factories or higher wages paid than at present. Building work in Detroit during July broke all previous monthly records when permits for the construction of \$7,000,000 worth of new structures, mostly homes and apartment houses, were issued. There is less labor trouble in the city than one month ago. Old strikes have died down and no new strikes have developed. The automotive industry is rushing production. New manufacturing concerns are springing into existence with such rapidity that all available manufacturing space has been utilized and scores of factory heads are unable to find accommodations to house their expanding business.

Bankers have compiled figures showing 87.15 per cent of all business here is flourishing. Of this total 50 per cent of the companies are doing better business than ever before and 37.15 per cent are doing good normal business. Only 12.85 per cent of business is below normal and all but 3.09 per cent is climbing to normal again. The figures show 83.07 per cent is improving while 13.84 per cent is stationary.

Detroit needs factory buildings almost as badly as it needs homes for its workers. The Board of Commerce is urging the construction of several large manufacturing structures in which from 5000 to 10,000 ft. of floor space can be provided and which will house several of these small concerns.

There is a constant shortage of labor here. Most of the factories are working through the Detroit Employers' Association and the daily demand for skilled workers is several hundred more men than the supply. While this shortage is not interfering with production, it is impossible for the plants to secure workers to man additional shifts which would be placed at work if labor was plentiful.

What labor trouble remains is principally affecting the packing houses, the building trades and the pattern shops.

NEW VARNISH PLANT

TOLEDO, Aug. 3—The Mountain Varnish & Color Works, a \$1,500,000 corporation, has started work here on six buildings which will constitute its new plant.

W. W. Mountain and other men, who formerly controlled the Flint Varnish & Color Works, Flint, Mich., are in the new company. John N. Willys, of the Willys-Overland Co., is also interested.

The buildings will have a total floor space of 200,000 sq. ft. They will consist of one main building three stories high, a 2-story office building and four modern 1-story buildings.

Damaged Planes Only Were Burned

**Air Service Officials Deny Stories
of Wholesale Destruction—
Baker Defends Ryan**

WASHINGTON, Aug. 5—Charges that the A. E. F. burned airplanes after the signing of the armistice, that it was short of airplanes during the war, and that John D. Ryan, former head of the Army Air Service, was associated with companies which were engaged in Government business, together with high praise for the Liberty engine and Mr. Ryan by Secretary Baker, have been the chief developments of the investigation which is being conducted by the sub-committee on aviation and the special House Committee on war expenditures. Charges involving the official conduct of Mr. Ryan were admitted to some extent by Secretary of War Newton D. Baker, who insisted, however, that a full understanding of all the circumstances would show nothing improper in Mr. Ryan's conduct in his public service.

Baker Defends Ryan

Secretary Baker admitted that Mr. Ryan was president of the United Metal Selling Co., which sold copper to the Government at 26c. a pound and later bought 85,000,000 lb. of surplus copper from the Government and private companies at 16c. and 17c. a pound and 15,000,000 lb. more at 23c. a pound. He declared, however, that he regarded Mr. Ryan as a high-minded, patriotic and devoted public servant, scrupulously honest in his business affairs and engaged at no time in any unworthy acts.

A shortage of airplanes in Europe for the A. E. F. was developed by Col. M. M. Patrick, former chief of the Air Service abroad, who stated that at the signing of the armistice the number of airplanes required by the American Army was 2720, while there were but 740 planes. American-made planes did not reach the line until Aug. 22, 1918, and after that time the American forces relied largely upon the French Government.

Unjust Criticism

Colonel Patrick stated that the criticisms of the Liberty engine and De Haviland-4 plane were unjust. He gave the total American aviation personnel abroad as including 7726 officers and 70,769 men. He stated that the personnel was out of all proportion to the number of planes on hand. "Had the war gone on longer," said Colonel Patrick, "we would have made a much better showing."

The colonel denied that any airplanes of value had been burned in France, and declared that all valuable parts, including engines, were taken from the planes which were burned because it was necessary to dispose of them. It was out of the question, he said, to ship the dismantled and damaged parts back and

would have been a waste of money to do so.

The committee has relied thus far in its examination on the results of the Senate investigation of aircraft made in the spring of 1918. This investigation, it was shown later, did not reveal the complete and accurate status and it is thought here that the foundation for the present investigation is consequently insecure and uncertain.

Great Britain Pays U. S. for Air Supplies

WASHINGTON, Aug. 6—The British Government has completed its payments to the United States for aviation supplies furnished during the war. Final payments totaled \$35,176,123.10, and the payments were for Liberty engines, airplane spruce, and other supplies as follows:

| | |
|--------------------------------|-----------------|
| Liberty motors | \$13,672,518.90 |
| Airplane spruce | 13,274,550.20 |
| Wood distillates | 2,887,554.00 |
| Nitrocellulose powder. | 4,690,000.00 |
| Cotton linters pool. | 651,500.00 |

Negotiations for payment were conducted by Chester W. Cuthell, representing the Secretary of War, and Lord Inverforth, Minister of Munitions of War for Great Britain.

NEW OWNER FOR CONCORD TRUCK

CONCORD, N. H., Aug. 7—The controlling interest in the Abbott-Downing Co., which makes Concord trucks, and has been building wagons for a century, has been purchased by M. A. Sevigne of Boston and Nashua, manufacturer of the Sevigne Wrapping Machine, and president of the National Wrapping Paper Co. He has been elected president and managing director, and F. J. Sevigne, a brother, is a director and assistant to the president.

Marcel Theriault, of Nashua, has been made manager of the plant, which has increased production facilities. There will be placed on the market shortly a delivery truck designed for the bakery trade.

RESTRICTIONS ON AIR MAIL

WASHINGTON, Aug. 6—To prevent the use of airplane mail service from carrying valuable mail matter, a bill has been introduced into Congress which would prohibit mail being carried by airplane when marked, "Not by airplane." The bill has been referred to the Committee on the Post Office and Post Roads.

INTERNATIONAL HARVESTER RESUMES

CHICAGO, Aug. 6—The International Harvester Corp. has resumed operation at its tractor works after suspension of 19 days due, according to a statement issued Tuesday, "to the intimidation of employees."

U. S. Rubber Co. Has 90,000 Acre Holding

**Plantation in Sumatra Is Half
Planted, Nearly All
Trees Bearing**

NEW YORK, Aug. 6—Announcement that the holdings of the United States Rubber Co. in Sumatra have reached an aggregate of about 90,000 acres was made here to-day. Of this total about 45,000 acres are fully planted, with more than five million trees, of which 85 per cent are now bearing. Extensions to the planted area are contemplated at an early date and increased production is expected as the younger trees grow in girth.

The holdings are said to constitute one of the largest plantations in the world.

Planting on the United States Rubber Co.'s property was begun in June, 1910, and by the end of the year 15,000 acres had been planted with growing trees. By the end of 1913 about 34,000 acres had been planted. The trees were planted 19 feet apart each way, 121 trees to the acre, with the view of bringing 100 trees per acre into bearing.

The plantation managers assured the company that they would have rubber from their own plantation in five years' time, but the growth was so rapid and healthy that rubber was obtained from newly-planted trees in less than four years. About 20,000 coolies are employed on the plantations.

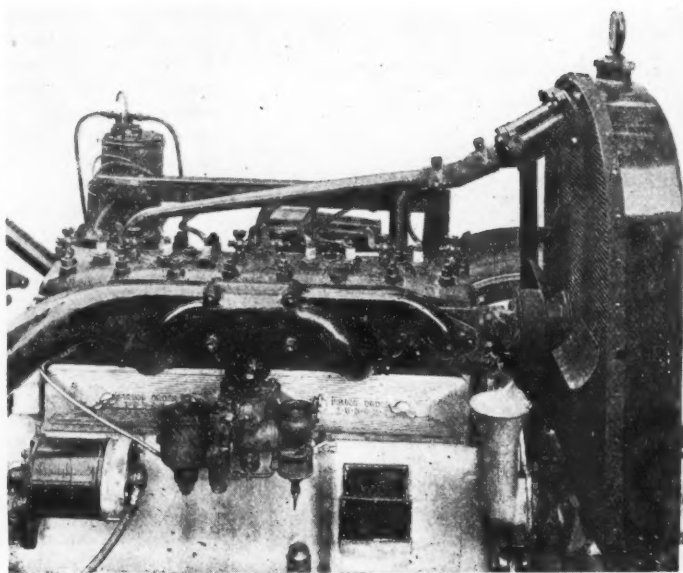
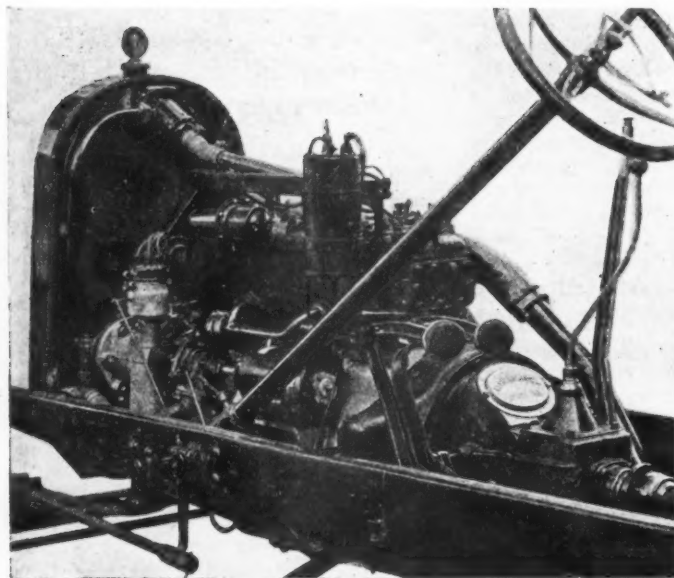
Number of Tractors in Use in Scotland Is Increasing

WASHINGTON, Aug. 6—The use of tractors is increasing in Scotland, according to reports received from Consul Johnson of Dundee by the Bureau of Foreign and Domestic Commerce. The Board of Agriculture has provided more than 200 for use among the farmers. Figures taken from a farm where the tractor has been in use for over two years make a comparison whereby the tractor cost of operation is considerably less than that of horses. Horses were estimated to plow 2 acres per day at a total cost of \$9.60, as against 5 acres per day by tractor at a total cost of \$7.20. The most valuable day's work secured from the machine was when, with a 6 ft. 9 in. binder, it cut 20 acres of oats in 11 hr.

GOODYEAR BUYS YARN PLANT

FALL RIVER, MASS., Aug. 6—The Connecticut Mills Co., a subsidiary of the Goodyear Tire & Rubber Co., has just bought the Globe Yarn Co. plant, the last of the yarn plants operated by the New England Cotton Yarn Co. It will be used for the manufacture of yarns for tire fabrics, which will necessitate a change in equipment. The plant operated 54,000 spindles.

The New Westcott Six



The new Westcott. At the left—Forward end of frame and powerplant of Westcott lighter six for 1920. At the right—Right side of Continental 7-R engine to be used

Continental Engine
For Westcott Six

New Car of Assembled Type
Will Be One of the First
with 7-R Engine

SPRINGFIELD, OHIO, July 31—The Westcott Motor Car Co. will shortly be in production on a new six-cylinder model, known as the Lighter Six. This car will be one of the first to be on the market with the new Continental 7-R engine, of which complete details will shortly be published in AUTOMOTIVE INDUSTRIES. Other units in the car, which is an assembled type, will include Timken axles, front and rear, Brown-Lipe gear-set, Spicer joints and tubular driveshaft, the clutch being Borg & Beck and the steering, Gemmer.

In bringing out the car the principal change is in connection with the new type of power plant. The wheelbase remains the same at 118 in., upon which a five-passenger touring, two-passenger roadster, three-passenger cabriolet coupe, and five-passenger sedan will be mounted.

The power plant is six-cylinder, $3\frac{1}{4}$ by $4\frac{1}{2}$ in. with three-point suspension. It has a removable cylinder head and an aluminum crankcase. It is of L-head construction, the valves being on the right, and having clear diameters of $1\frac{1}{8}$ in. This combined with a $5/16$ in. lift gives exceptional valve capacity in the new engine.

The crankshaft has four bearings, $2\frac{1}{4}$ in. in diameter, oiled by a gear type oil pump producing a pressure feed of 35 lb. through the drilled shaft to the main bearings, lower connecting rod bearings and gearcase, the remaining parts being oiled by vapor.

Automatic thermostat regulation is

employed for cooling control, an unusual feature in the cooling system being the employment of a three-way outlet pipe to the radiator instead of the usual single line. The gasoline system includes a Rayfield carburetor with Stewart vacuum feed. Delco starting and lighting is used with Bendix drive, the starting motor being on the right and the generator, which is driven off the water pump shaft, is on the left. The Delco distributor is also on the left side of the crankcase at the front and is operated by a vertical shaft through a spiral gear drive.

The chassis frame has been redesigned and now has a 7 in. side rail, the front springs being semi-elliptic, 36 by 2 in., with six leaves. The rear springs are semi-elliptic, 56 by 2 in., with eight leaves. Complete fittings are provided throughout, the instrument board being of solid walnut. The price will be announced later.

Paige to Issue New Stock?

DETROIT, MICH., Aug. 2—A new issue of preferred stock totaling \$3,000,000 is under consideration by the Paige-Detroit Co., according to reports. Should the new issue be brought out, the present preferred stock may not be called, it is understood.

PAIGE PRICES GO UP

DETROIT, Aug. 5—Prices of the Paige-Detroit Motor Car Co. models have advanced from \$40 to \$90, due to the increasing cost of the materials used. The price increases go into effect at once, as follows:

| | Old Price | New Price |
|--------------------------|-----------|-----------|
| Paige Linwood, 39..... | \$1,555 | \$1,595 |
| Paige Essex, 55..... | 2,060 | 2,150 |
| Paige Larchmont, 55..... | 2,165 | 2,255 |

Velie Announces New
Six With Refinements

New Engine—New Body Design
—Bevel-Border Fenders—
Octagonal Lamps

MOLINE, ILL., Aug. 6—Many changes are evidenced in the 1920 Velie Six, model 48, which has just been announced. The $3\frac{1}{4}$ x $4\frac{1}{2}$ in. Continental engine is fitted with an internally heated vaporizer designed to insure efficient operation on low-grade fuel, and the smaller mechanical details have been refined. The gasoline tank is larger than before and ignition is now an Atwater Kent system. Bijur starting and lighting takes the place of the Remy used on the former model.

Bodies have been redesigned. The new radiator is higher and the tapering hood blends with the high-cowl, straight-line body. The floor-boards are depressed to give maximum leg-room in the driver's compartment. Fenders have beveled borders, and octagonal head and tail lamps have been added. There are five body styles: touring, roadster, sport coupe and sedan. Prices have not yet been announced.

RESTA HAS SUNBEAM

NEW YORK, Aug. 5—Dario Resta, who has obtained the American agency for the Sunbeam car, announces that he will specialize in the 24-hp. six cylinder type, selling at \$8,000. He has been expecting cars to arrive from England for over a month, but they have been delayed by unsettled labor conditions in the British Isles.

Resta has opened headquarters at 1834 Broadway.

Wadsworth Mfg. Co. Suffers \$1,000,000 Fire Loss

DETROIT, Aug. 1—The Wadsworth Manufacturing Co., maker of sedan bodies for the Ford Motor Co., was swept by fire Friday night. The loss will total \$1,000,000. The painting, finishing and trimming departments were destroyed. The woodworking departments are intact. At the Ford company it was announced that Ford sedan production would not suffer, inasmuch as the Ford company is taking its bodies direct from the Wadsworth woodworking department and painting and trimming them itself.

The fire, which was one of the most disastrous in the city's history, spread to small structures on the property of the Maxwell-Chalmers Co. and for a time threatened the destruction of that plant also.

ZENITH GROWS

DETROIT, Aug. 2—The Detroit plant of the Zenith Carburetor Co. is producing 1800 carburetors daily and has just increased its capitalization from \$40,000 to \$320,000. Extensive building work is about to start, the nature of which will be announced later. It is understood that contemplated improvements include doubling the office space and erecting of a large service station. Plant units built during war period for war work are now in commercial production, giving the company ample manufacturing space and facilities to accommodate a great amount of new business. During the war the Detroit plant produced airplane carburetors for Liberty and Curtiss engines at a rate of 800 daily.

PLAN HARVESTER MERGER

NEW YORK, Aug. 1—The General Harvester Corp. has been incorporated under the laws of Michigan, according to announcemen here, to engage in the manufacture and sale of agricultural machinery. The company has a nominal capital of \$100,000, but it is stated that this will be increased to \$10,000,000 when certain units, tentatively accepted, are included in the merger.

NEW WILLYS SCHEME

NEW YORK, Aug. 4—A special meeting of the Willys-Overland Co. has been called for Aug. 14 to pass upon a proposed contract with the Willys Corp., organized to manufacture a new six-cylinder car which the Willys-Overland Co. would distribute.

NEW CALIFORNIA PLANT

SAN FRANCISCO, Aug. 4—The Scripps-Booth Co. of California will erect in the spring a \$1,500,000 automobile factory. Clifford Durant, Chevrolet branch manager, heads the company.

PISTON RING CO. LARGER

MUSKEGON, MICH., Aug. 2—The Piston Ring Co. will begin the immediate construction of an addition that will be

two-thirds the size of the present plant. It will be finished in four months, and will consist of a four-story, re-enforced concrete building, a one-story "L" and a brick building in the rear. The four-story structure will be 133 ft. in length and 55 ft. wide, while the "L" will measure 65 ft. by 55 ft. The brick building will be 65 ft. by 60 ft. Another addition to the machine shop, besides a foundry more than double the size of the one now in use, will be erected in the near future.

The present floor space of the concern is 48,209 sq. ft., while 32,461 sq. ft. will be added.

NEW TRACTOR UNDER WAY

MILWAUKEE, Aug. 1—The Phoenix Mfg. Co., Eau Claire, Wis., is engaging in the construction of a new type of tractor under contract with the Yankee Boy Tractor Corp., which is about to enter the market. The machines now in process will be used for demonstrations and the Yankee Boy company intends to open a factory of its own before the end of the year. The new tractor is a three to four plow design, using kerosene as fuel.

TEXAN PRICES ANNOUNCED

FORT WORTH, TEX., Aug. 4—Prices for the Texan, the passenger car and truck made here by the Texas Motor Car Association, were announced here to-day as being \$1,250 for the two models of roadster and the touring car. Truck prices are to be \$1,200 for the $\frac{3}{4}$ -ton model, with \$1,425 the list on the $1\frac{1}{2}$ -ton chassis.

NEW REO FACTORY

LANSING, MICH., Aug. 2—Excavations for the new factory units to be erected by the Reo Motor Car Co. are well under way. The construction of the unit will mean the conversion of the former tractor unit into a motor plant.

FRUEHAUF EXPANDS

DETROIT, Aug. 2—A five-acre factory site has been purchased here by the Fruehauf Trailer Co., just east of its present location on Gratiot Avenue. A new plant will be erected shortly, President Fruehauf announced. It is planned also to increase the capital stock from \$100,000 to \$250,000.

KISSEL INCREASES FACILITIES

HARTFORD, WIS., Aug. 5—The Kissel Motor Car Co. is equipping its body shop, used for several years as a storehouse, with new machinery for wood and metal work. A force of 175 to 200 body workers will be added. The body shop, built four years ago, has long been overcrowded.

CONTINENTAL TO ENLARGE

MUSKEGON, MICH., Aug. 2—The Continental Motors Corp. of this city is reclaiming a tract of 35 acres from Muskegon Lake on which it plans to construct an addition costing about \$1,000,000.

Hudson Building New Plant for Essex Car

Company Plans to Double Production in 1920—Project Will Cost \$2,250,000

DETROIT, Aug. 2—The Hudson Motor Car Co. is about to spend \$2,250,000 to build a plant for the manufacture of Essex cars. Of this sum, \$1,250,000 will be invested in land and new buildings, and \$1,000,000 in machinery and equipment. Work on the new plant is under way.

The Hudson company proposes to double its output in 1920. The company will produce 70,000 cars of both makes next year. This year's schedule called for 40,000 machines, 20,000 Hudson and 20,000 Essex.

Both cars are at present being made in the Hudson plant, but when the new factory is complete and running this October it will handle all of the operations going into Essex manufacture with the exception of two departments: the machine and engine testing departments.

Ground has been broken for the new Essex assembly plant. It will be 340 x 400 with 136,000 sq. ft. of floor space, of steel and concrete. Although but one story high, the foundations will be laid so as to carry the weight of two or more additional floors if they are needed later. This building will house the domestic and export shipping facilities as well as all assembly lines.

The receiving rooms, offices, and stock inspection departments will be installed in a brick building which was built last year for war purposes. This structure has 24,000 sq. ft. of floor space. Other units will be built at once, but detailed information is not available.

MICHIGAN TRACTOR SHOW

DETROIT, July 31—Seven Michigan counties are backing a tractor demonstration to be held Aug. 8 at Marshall. The counties interested are Kalamazoo, Eaton, Barry, Jackson, Branch, St. Joseph and Calhoun.

Twenty tractor manufacturers have signed to enter their products. Among the tractors to take part are the Bates, Mogul, Titan, Samson, Cleveland, Hart-Parr, Fordson, Moline, Heider, Oil Pull, La Crosse, and Case. Each tractor will have a definite amount of ground to plow, proportioned to the number of plows hauled. All fuel used will come from the same source. The ground must be plowed to the depth of seven inches.

U. S. TRUCK DIVIDEND

CINCINNATI, Aug. 1—A 7 per cent dividend on the common and the regular quarterly $1\frac{1}{4}$ per cent dividend on the preferred were voted at the annual meeting of the United States Motor Truck Co., just held here. The old officers were re-elected, while the directorate was increased by the addition of R. J. Firestone, E. C. Shumard and W. H. D. Totten.

Car Production Not Catching Up

Even By Doubling Capacity It
Will Take Years for Pro-
duction to Meet Demand

DETROIT, Aug. 2.—Automobile manufacturers here believe shortage of automobiles will continue for at least three years. Even if production in the plants is doubled next year, it will fall far short of the demand.

With all of the General Motors Corp. passenger car units preparing exceptionally heavy production schedules for 1920, with Maxwell-Chalmers, Hudson, Liberty, King and other firms building new manufacturing plants permitting them to double their facilities, the coming year will see the greatest output of automobiles in its history. However, this increased output, it is said, will be several hundred thousand cars behind orders.

Annual Production

In 1918, according to the National Automobile Chamber of Commerce, 1,044,754 passenger cars were made. In 1917 the production totaled 1,737,151 cars. In 1916 the factories turned out 1,493,617 machines. In compiling the above figures, Ford production is not included. They reveal a normal annual production increase of 40 per cent. War restrictions made 1918 production sub-normal. Had normal conditions prevailed the 1918 output would have totaled 2,750,000, or twice what it actually was.

Thus January, 1919, saw a shortage of 700,000 cars. This shortage has been steadily growing, because it has taken nearly five months for all the companies to shift from war to peace schedules. Even now production in some of the plants is not normal. Until a few weeks ago sales orders were piling up and production lagging behind. It is now estimated that the 700,000 car shortage in January had grown to be nearly 1,000,000 in June.

1,500,000 Cars Scrapped Annually

The average life of an automobile is given as five years. Basing an average upon the production figures for the last five years it is safe to figure that 1,500,000 cars are scrapped annually. Thus 1919 opened with an estimated shortage of 2,200,000 cars, and this shortage may possibly reach the 2,500,000 mark.

By rushing production during the next six months, the factories may produce a grand total of 1,500,000 automobiles. The first quarter, however, shows that 250,000 were produced. If 1,500,000 cars are built in 1919, the year 1920 is going to open with a greater car shortage than in 1919. There will be an actual shortage of approximately 1,000,000 cars, not considering 1,500,000 machines slated to go out of commission which must be replaced.

Export business is just as heavy as

domestic business. The demand for cars from abroad is greatest in the industry's history. While many machines are being shipped abroad, they are few compared with production. For instance, one company turning out 230 automobiles daily is only producing six daily for export. The companies have all adopted the policy of caring for home demands first and inasmuch as home demands are so great at present, they are shipping just enough overseas as is necessary to keep foreign sales organizations alive.

Studebaker Schedule Calls for 40,000 Cars

NEW YORK, Aug. 2.—Reports made by the Studebaker Corp. are that the company is now producing at the rate of 4200 cars a month and expects to continue that figure for the second half of the year. A total of 40,000 cars for 1919 is thus forecast. The new buildings of the South Bend units are expected to be under roof in December, with new cars being turned out in March. Government work, except for about \$2,500,000 that should be completed within thirty days, is practically cleared up.

MASON TIRE CO. EXPANDS

KENT, O., Aug. 2.—Contracts for the erection of two large additions to the plant of the Mason Tire & Rubber Co., the third enlargement in as many years, have been let. The new structures will double the plant's capacity and add about 500 workers. Coincident with this announcement comes one that the company has organized the Mason Plantation Company for the purpose of acquiring rubber plantations in the Far East. J. P. Mathews, purchasing agent for the tire company, will be manager of the plantation concern and with O. M. Mason, the president, will leave shortly for Singapore for that purpose. Mathews will live there permanently.

RUBBER CO. TO BUILD

CLEVELAND, Aug. 2.—The Ashland Tire & Rubber Co. of Ashland, Ohio, with temporary offices here, announced that plans have been prepared for the erection of a modern tire plant at Ashland, costing approximately \$150,000.

The Ashland is one of the last firms to enter this field. It is incorporated for \$1,000,000 and, for the present, will manufacture high-grade cord and fabric tires and inner tubes. Later on a line of mechanical goods will be added.

KELSEY TO EXPAND

NEW YORK, Aug. 2.—Announcement has been made here that the Kelsey Wheel Co., Inc., of Detroit, plans the expenditure of \$1,000,000 to increase its manufacturing facilities at Memphis, giving employment to 4000 workers. Forty acres of land have been purchased for the additional facilities. The company produces parts for the Ford car.

Suggest Big Four of Trade Associations

NEW YORK, Aug. 5.—An administrative council, or "Big Four" of the national automobile associations, to co-operate on problems of legislation, policy and other subjects vital to the manufacturing and merchandising of motor vehicles, has been proposed. It would consist of General Managers Reeves, Hemingway and Mook of the National Automobile Chamber of Commerce, Motor and Accessory Manufacturers' Association and National Automobile Dealers' Association, respectively, and Commissioner Webster of the Automotive Equipment Association.

The council would serve as a clearing house for the work of the associations. It has been taken up so far only in general terms, having been discussed last week by Hemingway and Mook when the former visited the headquarters of the N. A. D. A. in St. Louis.

Franklin to Produce 18,000 Cars a Year

SYRACUSE, N. Y., Aug. 5.—The Franklin Motor Car Co., having outlined a production program of 18,000 cars a year, has begun erection of a \$400,000 addition to its plant here, at the same time employing a night shift of 500 men. Ground was broken last week for the new building, which is to be ready for occupancy Jan. 1.

MIDLAND TIRE WILL EXPAND

CLEVELAND, Aug. 5.—Directors of the Midland Tire Co. decided to increase the capacity of the plant. Two shifts of men now are working and a third shift is to be added soon. The plant is turning out 250 tires a day and soon will start making inner tubes.

The Midland company took over the McClurg Rubber Co., in 1916, and is continuing to make the McClurg tire. Directors elected are: L. F. McGrath, Nicholas Arth, and Henry Born of Cleveland; C. M. Christenson, Dr. Jesse McClain, M. Q. Baker and Dr. H. R. McCurdy, of Coshocton. Mr. McCurdy was re-elected president, and Mr. Christenson, secretary, treasurer and general manager.

GILLETTE OUTPUT LARGER

MILWAUKEE, Aug. 1.—The Gillette Rubber Co., Eau Claire, Wis., manufacturer of cord, fabric and solid tires, is rapidly getting back to capacity production after experiencing labor trouble for seven or eight weeks. While part of the force was on strike, work on a large plant addition was continued.

LOCK COMPANY MOVES

CHICAGO, Aug. 2.—The Edwards Sales Co. has moved to this city from St. Louis, taking up quarters at 1919 Michigan Avenue. The company makes the Johnson automobile lock.

Advertising Man Now Heads Fulton

NEW YORK, Aug. 6—The resignation of William F. Melhuish, Jr., as president of the Fulton Motor Truck Co., announced recently, has been followed by a statement that he remains the largest individual stockholder in the corporation, but will give the greater part of his time to the affairs of a Wall Street investment brokers' firm with which he is associated.

The Fulton concern, established three years ago at Farmingdale, Long Island, by Melhuish, has grown until its annual production now is 2000 to 3000 vehicles a year, and the increase in business has necessitated opening of general offices in New York.

Melhuish has been succeeded in the presidency by George C. Sherman, head of the Sherman & Bryan advertising agency and the Universal Tobacco Stripping Co. Carl Page is the new vice-president in charge of merchandising, and other officers will be chosen at a directors' meeting this week.

ROAD CONDITIONS IN REPORTS

WASHINGTON, Aug. 2—The weather bulletins issued by the Department of Agriculture will in the future also show road conditions. The work was begun by the Weather Bureau as an aid to winning the war, and at first the service applied merely to motor transportation in some eastern states. Without any special appropriation the Weather Bureau is undertaking in certain states to add daily news of road conditions to its other services.

ROAD BUILDERS TO MEET

CHICAGO, Aug. 4—The ninth American good roads congress under the auspices of the American Road Builders' Association will be held in Louisville, Ky., the second week of February. The eleventh national good roads show will also be held in connection with the convention.

NEW TOOL CO. FORMED

DETROIT, Aug. 1—The Roesch Tool Co. has been granted a charter with a capital stock of \$20,000. The company formerly operated under the name of the R. & L. Tool Co. and employed 25 men. The plant will produce tools, dies and steel products. George F. Roesch and F. E. Calkins are the principal stockholders.

AUSTRALIAN TRADE IMPEDED

WASHINGTON, Aug. 1—Trade with Australia is impeded by the high rate of exchange with New York (\$4.50 to the pound sterling in Adelaide in June and \$4.60 in Melbourne), and some Australian importers forecast that imports from America will decrease very ma-

terially if the situation is not rectified.

It is suggested that a branch of an American bank in Australia could grant credits to local importers upon approved paper, at current interest rates, and arrange to have the proceeds made available for payment in New York for goods shipped by American manufacturers, who would thus receive cash upon shipment, while the importers would not have to pay their notes until the goods had arrived and had been sold. This is the method employed by the British banks, and the lack of it has proved a serious handicap to business with America.

A New York bank (whose name will be given upon application to the Bureau of Foreign and Domestic Commerce) has recently established a branch in Sydney for the promotion of American commerce.

The unsatisfactory condition of exchange with Australia is chiefly attributed to the fact that most of the tonnage allotted to this country must be used to carry commodities which have already been purchased by the Imperial authorities. These cargoes having been paid for, do not help the exchange rates by the creation of credits in London, as these balances were exhausted long ago.

NEW ILLINOIS TRACTOR CO.

ROCKFORD, ILL., Aug. 1—The Winnebago Tractor Co. has been incorporated with capital stock of \$150,000. It is proposed to manufacture and deal in a new type of tractor as soon as suitable buildings can be erected. The incorporators are G. N. Whitford, N. C. Bement and A. L. Wienke.

BEAR TRACTOR CO. CHARTERED

NEW YORK, Aug. 2—The Bear Tractor Corp. of America, with a capital stock of \$2,500,000, has been organized in Delaware to manufacture and deal in farm tractors. The incorporators are S. I. Donner, J. L. Crandall and H. A. Victor Crawford.

CASE IN DELAWARE

NEW YORK, Aug. 2—Announcement has been made that the J. I. Case Plow Co. has been chartered in Delaware with a stock of \$22,500,000 to make and sell agricultural implements of all kinds. The incorporators are P. B. Drew, C. L. Rimlinger and H. E. Knox.

AMERICAN TRUCK CO. BUILDS

NEWARK, OHIO, Aug. 4—Work on a new concrete office building for the American Motor Truck Co. has been started here. This company has just placed in production the new Ace truck.

BUILDS DUMP BODIES

MILWAUKEE, Aug. 1—The Heil Co. of this city is now specializing in the production of dump bodies of all kinds, with hydraulic hoisting equipment, for application to motor trucks.

Real Tractor Tests Are Held in Ohio

Systematic Plowing and Oversight by Observers Give Chance to Study Performance

MIDDLETOWN, OHIO, August 2—While practically a repetition of the tractor demonstration at Columbus, July 28 and 29, the tests here yesterday and to-day, nevertheless, added their share to the fund of useful information being gathered by the Ohio State University regarding tractor performance. When the tests are over at Fostoria and Akron about the middle of the month the Department of Agricultural Engineering of the university will have a complete set of figures.

The machines work under conditions identical with those surrounding farm operation. That is, no corps of mechanics and plow experts follow the machines around. There is no fussing with the engine once the machine has started. Plow experts are allowed to make the final adjustments on the first two rows, but after that they watch the machine from a distance. Those who follow on the field are chiefly farmers or prospective owners.

The demonstration is carried out on a businesslike basis. It is especially interesting to watch the observers. They see that the rules are not misapplied. Each machine has its observer and the observer knows exactly what to look out for. Thus there is no skipping on the field and no machines plow faster than their advertised plowing speed.

All the tractor men, farmers, accessory men, in fact everyone is out for the good of power farming. During the private demonstrations, which take place from 3 to 5 o'clock daily on the test days, makers or dealers describe the merits of their particular machines. When the public demonstrations are on, however, the two-dozen or more machines work as a unit to spread the gospel of motorizing the farm.

TRAILER CO. CHANGES

SAN DIEGO, CAL., Aug. 1—The California Trailer & Radiator Co. has changed its name to the Marx Trailer Co., which is now being incorporated for \$200,000, and will be on an extensive manufacturing basis within a few weeks. It has been manufacturing light commercial trailers for three years, but is now specializing on the Komfy Kamping trailer.

RELIANCE DOUBLES STOCK

APPLETON, WIS., Aug. 1—An increase of from \$500,000 to \$1,000,000 of the capital stock of the Reliance Motor Truck Co. was announced here to-day. Plans are under way for the erection of a 4-story plant addition, 70 by 300 ft., to cost about \$160,000.

Aviation Secretary Proposed In Bill

Curry Measure Provides for Cabinet Officer Heading Federal Department

WASHINGTON, Aug. 6—A bill providing for a Department of Aeronautics has been introduced by Representative Charles F. Curry of California.

Mr. Curry pointed out that the bill would co-ordinate the Air Service of the Army, Navy, Marine Corps and Post Office Department, providing also Federal control of commercial development of aircraft.

Mr. Curry explained that the Royal Air Force of Great Britain was the most efficient of all air forces, and that this efficiency was achieved and maintained through the establishment of a separate government department.

"It is my opinion, and I believe the opinion of all who have given thought to the matter, that if we are to attain and maintain the position in the air our national dignity and welfare warrants and our defensive preparation demands, it is imperative a separate department to this end be created," Curry declared.

Provisions for Commercial Development

The bill provides that commercial development shall be licensed, fostered and assisted by the Department of Aeronautics within reasonable and proper lines. It also provides that civilian aviators shall be licensed by the department. It makes the Secretary of Aeronautics a Cabinet official.

Not later than six months after the passage of the bill, detailed estimates for the establishment of an aeronautical academy for the training of cadets in the science of aeronautics, who shall be commissioned in the regular air force when graduated, are provided for. Provision also is made for the establishment of such aircraft factories as may be required for the manufacture of aeronautical equipment and material.

All clerks and employees of the War, Navy and Post Office Departments, or other bureaus or offices on duty per-

taining exclusively to aeronautics would be transferred to the Department of Aeronautics at their present grades and salaries.

The enlisted strength of the air force is limited to 50,000 men.

It is also provided that officers holding permanent commissions in the Army, Navy or Marine Corps now serving or who have served in the Army Air Service, the Naval Flying Corps or the Marine Flying Corps between April 6, 1917, and November 11, 1918, and such temporary officers of the Army, Navy and Marine Corps as held active commissions in the aviation branches thereof at the time of the passage of this act shall be eligible for appointment and commission in the regular air force without examination.

After combining all branches of military aviation the Secretary of Aeronautics would be entrusted with such matters as prescribing rules, laying out fields, protecting the forests, borders and coasts. Plans for national defense and the mobilization of the air forces in time of war would be assigned to the operations division of the department.

If the prediction of Otto Praeger, head of the United States Air Mail, that giant airplanes will soon carry United States mails from New York to San Francisco in thirty-six hours is to come true and other now almost inconceivable feats accomplished, Curry says it will be essential that speedy and favorable action be given his measure. A similar bill was introduced in the Senate by Senator New of Indiana.

PLANES TO PATROL CANAL

WASHINGTON, Aug. 2—Two hundred and seventy airplanes have been shipped to the Panama Canal Zone, where they will be used for patrol duty.

Civil Aviation Committee Appointed in Great Britain

WASHINGTON, Aug. 1—A seaplane, the structure of which will be built entirely of duralumin, with a total lift of 50 tons, of which 20 tons will be made up of fuel, oil, passengers and goods, is being designed by Messrs. Vickers, Ltd. The calculated speed is 100 m.p.h.

A standing advisory committee on civil aviation to advise and report on the best method of organizing imperial air routes and on other subjects relating to civil aviation, has been appointed by the British Air Ministry.

A Dutch delegation recently visited Great Britain to discuss the development of aerial transport from Great Britain to Australia by way of the Dutch East Indies.

The airdromes for oversea traffic have already been chosen, and are as follows: For continental traffic, Lympne, in Kent; for Dutch traffic via Harwich, Hadleigh, in Suffolk; for Scandinavian traffic via the Humber, New Holland, in Lincolnshire; for trade direct to London, Hounslow, in Middlesex.

NAMES FOR AIRCRAFT

WASHINGTON, Aug. 4—"Airship" has been officially adopted by the United States Air Service as the designation for dirigible balloons, according to announcement made last night. Heavier-than-aircraft will be termed "airplanes."

NEW PLANE CARRIES TEN

NEW YORK, Aug. 2—A new airplane for passenger-carrying service for the government will be completed within a month by the Glenn L. Martin Co. The plane will carry ten passengers and pilot and mechanic. The construction of similar planes for commerce is expected.

FLEW 55,671,920 MILES

WASHINGTON, July 31—United States Army airplane pilots flew approximately 55,671,920 miles in the 563 days from Jan. 1, 1918, to July 17, 1919, it is estimated by Director of Air Service Menoher.

Flights aggregating 927,852 hours' flying were made. The statistics include only flights from fields in the United States.

SOUTH AMERICAN FLIGHT

WASHINGTON, Aug. 2—The first aerial trip across the South American continent from the Atlantic to the Pacific was completed Wednesday by Lieut. Locatelli, a member of the Italian aviation mission now in Argentina.



This photograph shows the Oriole, the new three-passenger Curtiss plane announced as the first of its type to be offered the commercial world. The Buffalo plant of the Curtiss Aeroplane & Motor Corp., the maker, already has turned out about 150 machines of this model. Its overall dimensions are length 25 ft., width 36 ft., height 9 ft. 5 in. It has a span of 36 ft. and a chord of 5 ft. Its total weight is 2188 lb., with a useful load of 767 lb. The service ceiling is about 15,000 ft., but it has a maximum altitude of about 17,000. Equipped with a K-6 motor, its high speed is given as 95 miles an hour and a low of 47.1. Recently Roland Rohlf, a Curtiss pilot, flew from Buffalo to New York, 450 miles, in 5 hours 2 minutes without a stop.

SOUTH AFRICA HAS NEED FOR TRACTORS

WASHINGTON, Aug. 4—A great interest in tractors is shown by the farmers in the district centering in Beira, Portuguese East Africa, due to the existence of the tsetse fly in the agricultural districts, and the consequent high mortality among animals used for plowing, according to a recent report from Trade Commissioner Lundquist. Recently five 20-25 hp. American gasoline-kerosene tractors were given a trial in this territory and have given satisfaction, despite the fact that the importers are hardly in a position to give proper service to the local purchasers.

Agricultural machinery men long experienced in the territory state that success in this field can only be attained by reputable American makers sending down to this part of Africa, at least for a time, some American factory men thoroughly conversant with tractor engineering, who can help the farmers during the development period, make arrangements for the carrying of parts at the chief centers, and who will try to develop repair shops at such places. Such factory men would, of course, cover all the southern portion of the African continent where agriculture is carried on. At present the importers know little of the tractor, can hardly afford to stock spares adequately, and have available no proper repair shop in the district. It is said that important repair jobs must be sent to Rhodesia, 375 miles away.

A list of Portuguese East African firms interested in American tractors may be obtained from the Bureau of Foreign and Domestic Commerce or its district or co-operative offices by referring to file No. 40438.

BRITISH TRADE LICENSES

WASHINGTON, Aug. 2—England will now grant licenses for the export of goods not on the list of prohibited exports to Czechoslovakia, Esthonia, Lettland, Lithuania and Poland, according to a recent cablegram from a London consul. Parcel post between England and Czechoslovakia has been restored.

PARCEL POST TO GERMANY

WASHINGTON, Aug. 4—The Post Office Department announces that, effective at once, parcel post packages for Germany will be accepted up to a weight limit of 11 lb. at the postage rate of 12 cents a pound or fraction of a pound.

TRADE WITH BRITISH MALAYA

WASHINGTON, Aug. 1—Now is the opportune time for establishment of trade between British Malaya and the United States, as the inhabitants are prosperous and there is a growing demand for foreign goods.

The purchasing power of the Penang district is considerable, as indicated by exports to the United States, which amounted to more than \$32,000,000 in

1918. Neither accurate nor detailed specifications of the imports into the Penang district from the United States are available, but an idea of the nature of this trade can be secured from the statistics of the Straits Settlements, which imported from the United States in 1917 goods valued at \$9,446,071 (motor cars and motorcycles comprising \$1,411,000 of that amount) as compared with \$6,776,812 in 1916. This is a very favorable market for motor cars and trucks, as there are no customs duties in Penang on these commodities.

Consular Officers Here Will Meet Business Men

WASHINGTON, Aug. 1—The following American consular officers are on leave of absence in the United States and will be glad to confer with business men and commercial organizations relative to conditions in their respective jurisdictions: Baylor L. Agerton, Copenhagen, Denmark, returns Sept. 6, can be seen at Fort Worth Club, Fort Worth, Tex. John L. Calvert, Nuevitas, Cuba, returns Aug. 30, should be addressed post office box 124, Black Mountain, N. C. Henry S. Culver, St. John, New Brunswick, returns Sept. 12, can be seen at 1600 East Long Street, Columbus, Ohio. Mahlon F. Perkins, Changsha, China, returns Sept. 18, can be reached at 1801 Manhattan Place, Los Angeles, Cal. William A. Pierce, Charlottetown, Prince Edward Island, returns Sept. 5, can be seen at 4012 Illinois Avenue, N. W., Washington, D. C. George N. West, Vancouver, British Columbia, who returns Sept. 9, may be addressed at Sherborn, Mass., P. O. Box 124.

TRADE-MARK FOR MEXICO

WASHINGTON, Aug. 4—American exporters desiring to gain prestige in Mexico should adopt a simple picture as a trade mark, something easily remembered, advises Consul Stewart at Chihuahua. The Mexicans call for an article by "picture," and firms using posters and signs to advertise their commodities should illustrate their advertisements with a picture.

NEW OIL IN MEXICO

WASHINGTON, Aug. 4—A new oil region comprising large and important oil deposits is reported in Mexico adjacent to the important mining section of Velardena and Pedricena, within easy reach of Parral and Torreon, and there is good railway connection with Monterey and surrounding territory. Claims are being filed and the action of the Government in conceding titles is in accordance with the prevailing laws which allow the conferring of titles to lands in vicinities which have not yet been opened up for exploitation. Further concessions for new wells will not be granted in regions where petroleum is now produced, pending the enactment of the proposed petroleum laws which are now being considered by the National Congress.

Motor Trade Makes Strides In Canada

Expect 350,000 Cars in Dominion This Year—Figures of the Industry

TORONTO, ONT., Aug. 4—R. H. Mulch, sales manager of the Chevrolet Motor Co. of Canada, Ltd., has made the following announcements:

"Automobile manufacturing is steadily assuming a more commanding position in the industrial circles of Canada. A preliminary report of the statistics relating to the automobile and other allied industries has been compiled by the Dominion Bureau of Statistics, which covers the operations of the establishments engaged in the manufacture of automobiles, accessories and repairs.

"The number of establishments classed as manufacturers of automobiles in Canada is 11, of automobile accessories 24, and repair work 497.

"The total capital invested in these industries is \$35,780,677, apportioned as follows: in automobiles, \$28,192,858, in accessories, \$3,155,893, and in repair shops, \$4,431,926.

"The value of material used in manufacturing and repair work in each class is: automobiles, \$35,585,820; accessories, \$3,788,308; and repairs, \$1,961,773.

"The total value of production and repair work for all classes is \$66,077,207, of which automobiles amounted to \$54,466,273, accessories to \$6,519,868, and repairs to \$5,091,066."

According to the presidential address of L. B. Howland, president of the Canadian Automobile Association, there will be over 350,000 cars in Canada by the end of the current year.

Canadian motor vehicle registrations for the year 1918 were: Ontario, 109,374; Saskatchewan, 47,239; Quebec, 28,338; Alberta, 29,500; Manitoba, 24,389; British Columbia, 15,828; Nova Scotia, 8103; New Brunswick, 6475; and Prince Edward Island, 4813.

The above figures illustrate the steadily increasing popularity of the automobile, especially in the rural districts, where motor transportation has proven a great aid to the farmer.

NO LIMIT TO SIBERIAN TRADE

WASHINGTON, Aug. 1—Due to certain misapprehensions regarding trade with Siberia, the Foreign Trade Advisers' Office, Department of State, has compiled the following notes:

"A misapprehension has apparently arisen to the effect that an Interallied Committee has been regulating exports and imports in Siberia. At present there is practically no restriction placed on trade with Siberia by the War Trade Board Section of the Department of State. A general export license, R.A.C.-77, covers practically all merchandise that may be exported to Siberia and an import license, P.F.B.-32, covers imports."

Tire Fabrics High But Supply Assured

Manufacturers, Relying on Imports, Look for No Handicap in Subnormal Cotton Crop

NEW YORK, Aug. 6—Though high prices will prevail, owing to the necessity of resorting extensively to imports to eke out a domestic cotton supply far below normal, there will be no scarcity of tire fabric sufficient to handicap the industry, in the opinion of manufacturing and purchasing heads of several of the leading rubber companies.

With the American cotton crop forecast at little over 60 per cent, there has been apprehension in some circles lest tire production be curtailed. Manufacturers showed no concern over the situation, however, declaring that with normal shipping conditions restored, it would be possible to draw heavily on the Egyptian cotton fields, assuring an adequate supply of fabric. They admitted that present high prices would probably prevail for some time, with a prospect of further increases, and saw little chance of the reduction in tire prices predicted last spring being put into effect.

In fact, the problem of the tire manufacturers is not to obtain raw materials, but to speed up production to meet the constantly growing demand for their products.

Several manufacturers saw in the high fabric prices, with rubber simultaneously on the downward trend, a condition likely to encourage growth of the re-treading industry. Rubber being the principal article in the re-treading process, and being obtainable at prices proportionately lower than the fabric, tire men would be prompted, they believed, to develop processes and expand facilities for re-treading.

COTTON OUTPUT

WASHINGTON, Aug. 2—The condition of the American cotton crop on July 25 was 67.1 per cent of normal, as compared with 70 per cent on June 25 and 73.6 per cent on July 25, 1918, the Department of Agriculture reported. This condition, the Department stated, forecasts a total production of 11,016,000 bales.

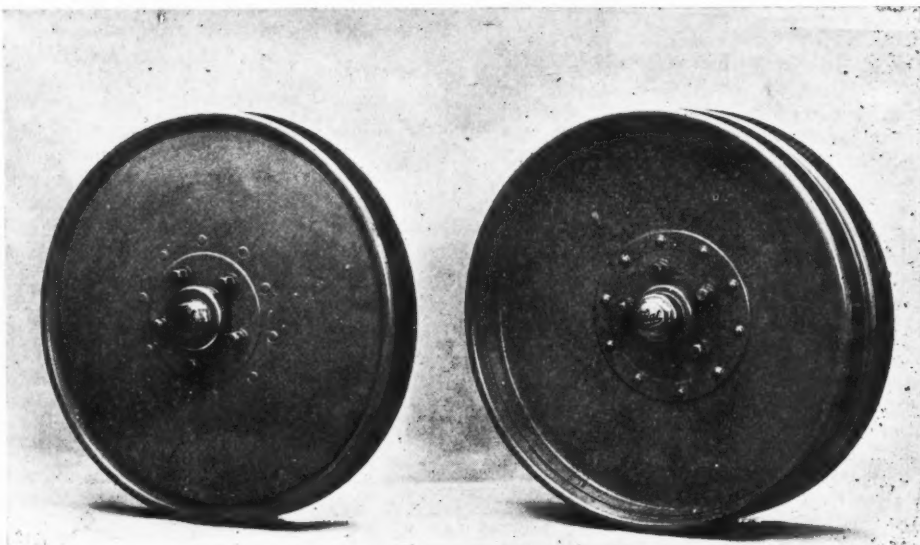
TIRES COST \$250 EACH

NEW YORK, Aug. 2—News reports reaching here from Budapest, Hungary, are that two carloads of French and Italian tires have been smuggled into that city in an effort to relieve the shortage. The tires brought \$250 each.

RUBBER CO. MAY EXPAND

NEW CASTLE, PA., Aug. 2—Stockholders of the New Castle Rubber Co. have been asked to vote upon a resolution providing for the creation of \$500,000 of seven per cent cumulative preferred stock.

Fiat Steel Disk Wheels



These wheels were used by the American Air Service

TIRES FROM U. S. IN TRINIDAD

WASHINGTON, Aug. 4—The Trinidad Automobile Association has an arrangement with an American firm manufacturing motor car tires whereby special discounts are granted members upon purchases effected through the association. At the annual meeting of the association at Trinidad on Feb. 14, 1919, it was stated they desire similar contracts with other tire manufacturers.

Since the present arrangement in 1918, tires worth \$3,253 have been purchased by members; the discounts totaled \$119. Tires valued at \$3,750 were bought direct by members of the association without any discount.

OWEN TIRE ADDING

CLEVELAND, Aug. 5—The erection of a large addition to the Bedford plant of the Owen Tire & Rubber Co. will be under way within sixty days. It is to be 80 x 62 ft., two stories high. The tract of land on which the factory is built consists of 14 acres.

SEGOR HEADS CANADIAN CO.

MONTREAL, Aug. 2—Officers and directors of the recently organized United States Rubber Co., of Canada, which has a capital stock of \$20,000,000, were elected here to-day, with C. B. Segor as president.

FEDERAL TO RICHMOND

RICHMOND, VA., Aug. 2—A distributing branch of the Federal Rubber Co. of Illinois has been opened here to handle the Southern trade. G. P. Blodgett is manager with Charles McGinnis, formerly of the New York branch, as office manager.

FRENCH BUY BODIES

LANSING, Aug. 2—The Auto Body Co. has received an order from the Bel-langer Frères Co., a French syndicate, for 1000 automobile bodies. This com-

pany is about to manufacture a new car which has been designed by Benjamin Briscoe and R. Stahl. The bodies are to be shipped at once.

Canadian Tire Co. Grows

MONTREAL, Aug. 4—The Canadian Consolidated Rubber Co., Ltd., has decided to spend immediately one million dollars on their tire plant here for the purpose of substantially increasing the output.

LOTIX TIRE FACTORY

FOND DU LAC, WIS., Aug. 5—The Lotix Tire Co. broke ground Aug. 1 for the first unit of its new factory, to be 40 x 200 ft., 2-stories high. The daily output will be 100 casings and tubes when the unit is completed about Oct. 15.

PERMIT TIN IMPORTS

WASHINGTON, Aug. 1—Pig tin and all metal alloys containing tin, including tin drosses, tin oxides, solder drosses, type metals, anti-friction metals, waste metals and other metals, will be permitted to be imported into the United States on and after Aug. 15, 1919, under General Import License PBF-37, according to announcement by the War Trade Board that W.T.B.R. 799 has been amended advancing the date from Sept. 1, 1919, to Aug. 15, 1919.

U. S. BOMBS IN FRANCE

WASHINGTON, Aug. 1—The War Department had nearly 35,000 tons of small arms and field gun ammunition and airplane bombs to bring back from France on July 20, the whole amount being valued at \$25,000,000. It included 121,000,000 rounds of rifle and 13,000,000 rounds of pistol cartridges, nearly 1,000,000 shrapnel and high explosive shells for 3-in. guns, and 103,400 shells for 8-in. howitzers.

N. A. C. C. Committees Are Named for Year

NEW YORK, Aug. 6—Fourteen committees, whose members will pass upon policy details of the National Automobile Chamber of Commerce, have been appointed by Charles Clifton, president of the organization, to serve during the coming year. They are:

Passenger Car Show Committee—John N. Willys, chairman, Willys-Overland Co.; H. G. Root, Westcott Motor Car Co.; Harry M. Jewett, Paige Detroit Motor Car Co.; S. A. Miles, show manager.

Patents—C. C. Hanch, chairman, Maxwell Motor Co.; Windsor T. White, White Motor Co.; C. W. Churchill, The Winton Co.; Wilfred C. Leland, Lincoln Motor Co.; Wm. MacGlashan, Studebaker Corp.; Robert A. Brannigan, manager.

Legislative—H. H. Rice, chairman, Chevrolet Motor Co.; D. C. Fenner, Mack Bros. Motor Car Co.; J. I. Farley, Auburn Automobile Co.; J. I. Barrows, Lexington Motor Co.; David Ludlum, Autocar Co.

Highways—R. D. Chapin, chairman, Hudson Motor Car Co.; W. E. Metzger, Columbia Motors Co.; Royal R. Scott, Willys-Overland Co.; S. M. Williams, Garford Motor Truck Co.; Geo. M. Graham, Pierce Arrow Motor Car Co.; Pyke Johnson, secretary.

Traffic—William E. Metzger, chairman, Columbia Motors Co.; A. I. Philp, Dodge Brothers; F. C. Chandler, Chandler Motor Car Co.; William L. Day, General Motors Truck Co.; Geo. Dickson, National Motor Car & Vehicle Co.; J. S. Marvin, manager.

Electric Vehicle—W. C. Anderson, chairman, Anderson Electric Car Co.; Fred. R. White, Baker R. & L. Co.; H. W. Suydam, Milburn Wagon Co.

Membership—C. W. Churchill, chairman, The Winton Co.; J. Walter Drake, Hupp Motor Car Corp.; Hugh Chalmers, Chalmers Motor Co.

Foreign Trade—J. Walter Drake, chairman, Hupp Motor Car Corp.; Peter S. Steenstrup, General Motors Truck Co.; H. M. Robins, Dodge Brothers; Jay Rathbun, White Motor Co.; E. C. Morse, John N. Willys Export Corp.; J. P. Roberts, Studebaker Corp.; H. B. Phipps, Hudson Motor Car Co.; H. R. Cobleigh, secretary.

Conservation—W. C. Sills, chairman, Chevrolet Motor Co.; G. R. Lippard, Stewart Motors Corp.; M. Cook, Service Motor Truck Co.; F. E. Bradfield, Velie Motors Corp.; C. A. Baird, Jas. Cunningham, Son & Co.

Motor Truck—Windsor T. White, chairman, White Motor Co.; Alvan Macauley, Packard Motor Car Co.; George M. Graham, Pierce-Arrow Motor Car Co.; Victor L. Brown, Sterling Motor Truck Co.; M. L. Pulcher, Federal Motor Truck Co.; R. H. Salmons, Selden Motor Vehicle Co.; D. C. Fenner, Mack Bros. Motor Car Co.; F. W. Fenn, secretary.

Rural Motor Express—James L. Geddes, chairman, Kelly-Springfield Motor Truck Co.; E. A. Williams, Jr., Garford Motor Truck Co.; O. H. Browning, International Harvester Corp.; A. T. Mur-

ray, Bethlehem Motors Corp.; Geo. D. Wilcox, Commerce Motor Car Co.; F. W. Fenn, secretary.

Truck Standards—David C. Fenner, chairman, Mack Bros. Motor Car Co.; Francis W. Davis, Pierce-Arrow Motor Car Co.; F. A. Whitten, General Motors Truck Co.; B. M. Sternberg, Sterling Motor Truck Co.; F. F. Beall, Packard Motor Car Co.

Hand Book—E. T. Strong, chairman, Buick Motor Co.; F. H. Akers, Reo Motor Car Co.; Geo. A. Kissel, Kissel Motor Car Co.; W. T. White, Mercer Auto Co.; Chas. Denby, Denby Motor Truck Co.

Truck Committee, on Standard Repair Parts and Service Policies—E. T. Herbig, chairman, Service Motor Truck Co.; H. W. Drew, Packard Motor Car Co.; W. M. Ladd, Pierce-Arrow Motor Car Co.; A. B. Cummer, Autocar Co.; W. M. Britton, Republic Motor Truck Co.

Trade Conference in Fall With Foreign Countries

WASHINGTON, Aug. 1—Invitations extended by the Chamber of Commerce of the United States to Great Britain, France, Italy and Belgium for a joint commercial mission to visit this country in the fall have been accepted. This was announced to-day at the Washington offices of the Chamber. The missions will participate at Atlantic City, during the week of Sept. 29, in an International Trade Conference. This conference will be attended, according to present plans, by leaders in American business who will discuss many phases of international trade relations.

FOR BELGIAN TRADE

WASHINGTON, Aug. 4—To place American firms in connection with Belgian firms who would be interested in their commodities, the Brussels Consulate has arranged with the Belgian Ministry of Economics for the publication in their weekly bulletin of trade items made up from the American commercial letters received by this consulate. American firms receiving replies from Belgian firms should get their information in regard to the different firms through a reliable bank or financial agency, as the Brussels consulate cannot take any responsibility.

EXPORT OPENINGS

WASHINGTON, Aug. 4—The Bureau of Foreign and Domestic Commerce, Department of Commerce, has received requests for automobiles or parts agencies of business from individuals and companies in foreign countries. For further information address the Bureau of Foreign and Domestic Commerce and specify the Foreign Trade Opportunity number.

Italy—Automobiles and accessories. Catalogs and price lists are requested. Correspondence should be in Italian or French. 30124.

Will Not Withdraw Tax On Automobiles

N.A.C.C. Learns Government's Financial Needs Stand in Way of Revenue Reform

NEW YORK, Aug. 6—Because of the Government's revenue needs there appears to be no likelihood that the tax on trucks and cars will be lifted for some time. Officials of the National Automobile Chamber of Commerce, including Alfred Reeves, general manager, interviewed Senators, Representatives and Treasury Department officers on the tax question last week, everywhere finding the same sentiment—that federal revenue needs will not permit elimination of the special assessments on the automotive industry.

The N. A. C. C. workers conferred with State and Commerce department officials relative to the automobile export situation, and discussed with revenue officers the recent ruling taxing sales of motor vehicles and parts to states and municipalities.

THE MARKET IN CHINA

WASHINGTON, Aug. 4—The use of motor cars has been made possible in Foochow, China, by the enterprise of the provincial officials, who have recently spent \$280,000 in improving the roads. The market for motor cars is limited by the lack of good roads, and, as the Chinese have shown a decided desire for motor cars whenever their use is possible, the suggestion has been made by prominent men in China that it would pay a combination of motor car companies to finance loans to the different provinces to be used only in road construction.

TRACTORS TO HAWAII

HILO, HAWAII, July 29—As a large sugar producing country, the Hawaiian Islands offer great possibilities for tractors. According to a report from a local concern, 20 to 40 hp. creeper type machines are needed immediately.

AFRICA WANTS TRADE NEWS

WASHINGTON, Aug. 1—The American Consul at Nairobi, British East Africa, reports that an additional number of American trade journals are desired by that consulate.

ITALIAN IMPORT MODIFICATIONS

WASHINGTON, Aug. 2—Automobiles imported into Italy will require a special treasury import license, according to information received by the Bureau of Foreign and Domestic Commerce through what are considered authentic sources.

TRADE JOURNALS WANTED

WASHINGTON, Aug. 2—American trade publications and catalogs of automobiles and automobile accessories are desired by the American consulate at Medan, Sumatra.

Seiberling Wanted to Head World Advertising Clubs

ST. PAUL, MINN., Aug. 1—A campaign to make Frank A. Seiberling, president of the Goodyear Tire & Rubber Co., the president of the Associated Advertising Clubs of the World has been commenced by the Town Criers Club of St. Paul, the local organization of advertising men. This club has written every member of the larger organization asking the election of Seiberling at the coming convention at New Orleans. Other member clubs are being asked to further the candidacy.

WRIGLEY IN AUBURN

AUBURN, IND., Aug. 4—An expansion of the Auburn Automobile Co., the first step in an attempt to treble production, was announced to-day. Chief of the new financial men behind the company is William Wrigley, Jr., the chewing gum manufacturer. He has been made a director.

Raymond A. Wiens, Racine, Wis., has been elected secretary and treasurer of the Racine Manufacturing Co., one of the oldest and largest manufacturers of motor car bodies in this country. Mr. Wiens was secretary of the old Mitchell Wagon Co., Racine. He has just been discharged from the army.

E. G. Parsons has been named chief of engineering for the Dayton Wire Wheel Co., Dayton, O. Parsons has been an engineer at the airplane experimental station at McCook Field, Dayton. He formerly was associated with Thomas & Thomas, consulting automotive engineers of Detroit.

Don S. De Vor, connected with the Olds Motor Works since 1911, has resigned to become works manager for a new passenger car concern now being organized in Elizabeth, N. J.

William L. Johnson of the Johnson Automobile Co., oldest Ford dealer in St. Louis, has been made treasurer of the St. Louis Automobile Manufacturers and Dealers' Association, succeeding W. S. Roberts of the J. I. Case Co.

H. F. Shepherd, manager of the automotive equipment department of the Toledo Rubber Co., will join the organization of the Baldwin Supply Co., of Charleston, W. Va. This company will enter the automotive equipment business as jobber.

J. A. Massie has retired as sales manager for the Hoyt Electrical Instruments Works, Penacook, N. H. M. T. Rogers will succeed him.

C. H. Walker has been appointed branch manager of the Pacific Coast branch of the Wire Wheel Corp. of America, with offices at San Francisco. Walker has been for several years district manager of the branch at Detroit of the Splittorf Electrical Co.

Glen Buck of Chicago has been appointed advertising manager of the Rubber Products Co., of Barberton, O.

Men of the Industry Changes in Personnel and Position

HAYNES TO NEW POSITION

LONDON, ONT., Aug. 4—Arthur J. Haynes, sales manager of the Ford Motor Co. of London, Ontario, has resigned to go to Windsor, where he becomes sales manager of the Champion Spark Plug Co. of Canada, Ltd. Prior to taking his new duties up, Mr. Haynes will spend a few weeks travelling about Canada. Returning, he will make his headquarters at Windsor, where a new quarter of a million dollar plant is being erected by the Champion Spark Plug concern.

WHITE VICE-PRESIDENT HONORED

CLEVELAND, Aug. 4—Walter C. White, vice-president of the White Co., has been made a chevalier of the Legion of Honor by the French Republic in recognition of the service of the company during the war.

J. C. McAdams has severed his connection with the Wyeth Hardware & Mfg. Co., St. Joseph, Mo., and will distribute gasolators, made by the Martin-Lumaghi Co., St. Louis, in West Virginia, New Jersey, New York, Delaware, Connecticut, Rhode Island, Massachusetts, Vermont, New Hampshire, Maine and Canada.

L. N. Burns, for some years past general sales manager of the J. I. Case Plow Works, Racine, Wis., has been elected vice-president of the company, succeeding the late F. R. Pettit. Malcolm Erskine was elected secretary and will also act as purchasing agent. He was formerly assistant secretary and treasurer.

James J. Harrington, manager of the New England branch of the Ford Motor Co., has been made manager of the branch at Copenhagen. R. F. Jones, manager of the Washington branch, has been sent to Boston to succeed Mr. Harrington.

Lieut. J. Lowcher has been named head of the accounting department of the Eisemann Magneto Co. He recently has been discharged at Camp Upton. Lowcher formerly was traveling auditor for the American Smelting & Refining Co.

Harry D. Benner has been appointed manager of the accessory sales department of the Federal Rubber Co., Cudahy, Wis. He formerly was eastern district sales manager of the Federal Motor Truck Co. in New York.

Herbert L. Boehm, formerly with the Hudson Motor Car Co., New York, has become associated with the investment securities house of E. H. Clarke, Inc.

HURLEY RESIGNS

WASHINGTON, Aug. 1—Edward N. Hurley, Chairman of the United States Shipping Board, left Washington to-day to resume private life on his farm in Illinois. John Barton Payne is named as probable successor. H. N. Robinson of Los Angeles and Thomas J. Scott of New London, Conn., are favorably reported as new members of the Board.

ESSENKAY PRESIDENT SAILS

CHICAGO, Aug. 5—Franc D. Mayer, president of the Essenkay Products Co., sailed from New York on the steamer *Coronia*, Aug. 2, for England, where a factory is being erected for the company. From this factory business for South Africa, India, Egypt, Australia, Canada and New Zealand will be handled. Mr. Mayer will also visit the company's French headquarters in Paris and the Italian office. He is expected back about Sept. 15.

OUSLEY RESIGNS

WASHINGTON, Aug. 4—Clarence Ousley, Assistant Secretary of Agriculture, who has been at the head of the war work of the Agricultural Department since 1917, has resigned, but will remain in Washington as editor of *Sea Power*.

FIRESTONE EXPANDS

AKRON, OHIO, Aug. 2—Stockholders of the Firestone Tire & Rubber Co. have been asked to vote on an increase in capitalization from \$15,000,000 to \$75,000,000, of which two-thirds is to be preferred and one-third common stock. Ten million in preferred will be sold at once to enlarge the plant, officials state.

STUTZ TO EXPAND

NEW YORK, Aug. 5—Directors of the Stutz Motor Car Co. of America have decided to call a stockholders' meeting to vote on their recommendation that the capital be increased by 25,000 shares of no par value, and that these be sold; present stockholders having the first opportunity to purchase, at \$100 a share.

OLLETIER TRUCK DESIGNER

PHILADELPHIA, Aug. 2—Through a misunderstanding, Hilton W. Sofield, vice-president of the Commercial Car Unit Co., was given credit in the issue of July 10 for designing the Keystone 2-ton truck. M. Ollietier, engineer of the company, was the designer.

TRACTOR MAN DEAD

MINNEAPOLIS, Aug. 2—P. J. Lyons, who in 1906 developed the Big Four tractor, which he sold to the Emerson-Brantingham Co., and in 1914 got into the Bull Tractor Co. as its president, selling his interest in February, 1918, died at Ontario, Ore., while on a trip. Mr. Lyons lived in Steele, N. D., twenty-four years, selling farm implements in a big territory.

STATEMENT OF GENERAL MOTORS

NEW YORK, Aug. 2—The following consolidated balance sheet for the General Motors Corp. and subsidiaries, as of March 31, 1919, has just been issued:

Assets: Real estate, plants and equipment, \$77,964,999; investments in allied and accessories companies, \$5,463,960; cash, \$45,874,800; Liberty bonds, \$24,219,747; marketable securities, \$113,206; drafts, \$11,485,581; due from U. S. Government, \$4,811,237; notes receivable, \$2,040,677; accounts receivable, \$19,335,020; inventories, \$99,178,558; deferred expenses, \$1,632,742; good will, patents, etc., \$35,714,893; total, \$327,835,421.

Liabilities: Debenture stock, \$31,656,200; preferred stock, \$17,190,100; common stock, \$147,424,800; purchase money bonds, \$150,000; outstanding capital stock of subsidiaries being portion not owned by General Motors, \$2,292,225, and surplus, \$517,231; accounts payable, \$20,506,806; notes payable, \$10,956,966; pay rolls accrued, \$2,505,076; accrued taxes, \$2,661,204; sundry items, \$3,007,842; reserves for taxes, etc., \$31,382,836; surplus, \$48,584,135; total, \$327,835,421.

G. M. C. ADDS TO TRACTOR PLANT

JANESVILLE, WIS., Aug. 5—The General Motors Corp. has purchased 63 acres here adjoining its present holdings of nearly 200 acres, upon which is situated the new Samson tractor works. The land will be used for future extensions. The third and fourth units of the Samson plant will be put under way within a week or ten days.

PIERCE ANNOUNCES EARNINGS

NEW YORK, Aug. 2—Announcement was made here to-day for the Pierce-Arrow Motor Car Co. that the company's surplus for the three months ending June 30, after taxes and charges had been deducted, totalled \$625,804, reported, as equivalent, after preferred dividends, to \$1.30 a share on the 250,000 shares of outstanding common stock of no par. This compares with \$1.47 a share in the preceding quarter and \$914,029, or \$2.85 a share in the June, 1918, quarter.

NEW MODELS FOR WINTHER

MILWAUKEE, Aug. 2—The Winther Motor Truck Co., Kenosha, Wis., which has increased its capital stock by \$1,000,000, is bringing out several new and unique types of commercial cars, one being a special self-contained truck designed especially for telephone and telegraph companies. The machine is equipped with a large boring device resembling an augur, which digs post holes in 10 to 20 minutes, a job which ordinarily requires four hours' time by hand. While no official announcement has been made, it comes from authoritative sources that the company will also soon market a "farm special" truck of the quadruple drive type that is said to combine advantages of a farm tractor with those of a commercial vehicle.

Current News of
FactoriesNotes of New Plants—
Old Ones Enlarged

Huge Expansion for Dodge?

DETROIT, Aug. 2—Dodge Bros. are reported to have purchased a tract of 278 acres on the West river front on which large blast furnaces and steel rolling mills are to be erected. The price for the tract was given out as \$2,085,000.

PRODUCE CANADIAN TIRE SOON

TORONTO, ONT., Aug. 4—It is the hope of the Aero Cushion Inner Tire & Rubber Co. of Ontario, Ltd., which is locating a plant in Wingham, Ont., to be able to start manufacturing shortly. The company, which has been incorporated by a number of local capitalists, has taken over the two buildings of the Western Foundry Co., Ltd., and is now putting them in shape for use.

The aero-cushion tire is the invention of E. L. Sherbondy, who will be general manager of the company. It is an inner tire, circular in form, moulded in size and shape to fit the outer casing, composed of pure para rubber, highly porous, to make it light and resilient.

ENLARGE TIRE PRODUCTION

BOSTON, MASS., Aug. 2—The present production of 300 tires weekly will be enlarged to as many daily as soon as additional machinery can be installed in the factory of the new Green, Dore & Morrison Co., at Canton Junction, Mass. This company succeeds the George Grow Co. Both cord and fabric tires of the rat tread type are being made and branches are to be opened throughout the country, marketing nationally a product which hitherto has been sold only in New England.

The new concern is capitalized at \$400,000, with the stock practically all sold, according to announcement here to-day. George R. Green is president, with Charles F. Dore vice-president and Andrew H. Morrison treasurer. The directors are James H. Littell, William A. Robb, H. Blanchard Flint, Anthony Cumbra and George Hutchinson.

KEYSTONE RE-ELECTS

NEW YORK, Aug. 4—Directors of the Keystone Tire & Rubber Co. were re-elected at the annual stockholders' meeting as follows: L. Walter Lissberger, Joel Jacobs, Sydney Bernheim, Nathan J. Miller, Julius Lichtenstein, Benjamin Lissberger and Walter Loewenthal. The directors elected the following: President, L. Walter Lissberger; vice-president, Sydney Bernheim; treasurer, Joel Jacobs; secretary, Walter Loewenthal.

Larger Quarters for Disteel
Division of Detroit Steel Co.

DETROIT, MICH., Aug. 1—Larger quarters for the wheel division, which manufactures Disteel motor wheels, of the Detroit Pressed Steel Co., were assured to-day by the announcement that the company had taken over the Carlton Avenue plant of the Detroit Shell Co. as an addition to its present plant. The addition has a floor space of 167,200 sq. ft., and was used during the war for the manufacture of munitions. The property comprises 27 acres. Disteel production will be accelerated in order to meet demands.

NEW FINNISH COMPANY

WASHINGTON, Aug. 1—The following is translated from the *Helsingin Sanomat*, a Helsingfors, Finland, daily:

"The Senate has granted a charter to the Transcontinental Co. (Inc.). This company is established to do a large general export and import business on its own freighters and is composed of the Yrjo Somersalo & Co., and the firm of W. Lucas of Chicago. The latter has branches in New York and in San Francisco, and during the war has supplied large quantities of material to the Russian Government.

"Some American banks have agreed to extend credit to the new concern and the company also proposes to establish its own banking houses in Finland and Esthonia."

FISHER ISSUES NOTES

NEW YORK, Aug. 4—The Fisher Body Corp. has placed on the market \$5,000,000 6 per cent serial gold notes, maturing \$1,000 annually Aug. 1, 1921 to 1925. They were offered at 96% to 99% and have all been sold. The funds will be used to refund current indebtedness and to provide additional working capital.

MILBURN HAS MORE SPACE

TOLEDO, Aug. 1—The Milburn Wagon Co. has added 40,000 sq. ft. to its present factories. Sections of the old buildings vacated by the farm wagon departments will be utilized for the manufacture of Milburn electrics. The wagon departments will be housed in a new plant.

CHARTER MULLINS BODY CO.

ALBANY, N. Y., Aug. 2—With a capital stock of \$1,350,000, papers of incorporation have been granted to the Mullins Body Co. for the purpose of manufacturing automobile bodies. The headquarters will be at New York City. Directors are Carroll G. Walter of New York and William P. Carpenter and Robert M. Modisette of Salem, Ohio.

MULLINS STOCK ISSUE

NEW YORK, Aug. 4—The Mullins Body Corp. is issuing \$1,000,000 8 per cent preferred stock and 70,000 shares of common stock without par value.

Army Will Retain 10 Types of Cars

Motor Transport Corps Announces Machines to Be Withheld from Surplus

WASHINGTON, Aug. 6—The Motor Transport Corps announced to-day that it will retain for use ten types of cars, trucks and trailers, which, however, will not be rated for the present as army standards. None of these vehicles will be placed in the surplus equipment list.

A statement by Brigadier General Drake gives the retained classes as follows:

Type 1—Passenger cars: Medium, open, Dodge; medium, closed, Dodge; heavy, open, Cadillac; heavy, closed, Cadillac.

Type 2—Light delivery truck: ½-ton light delivery, Dodge; ¾-ton, White; ¾-ton, G. M. C.; 1-ton, White, Aebo.

Type 3—1½ and 2-ton trucks: White, Garford, Packard.

Type 4—3 and 4-ton trucks: Standardized "B;" Riker; Mack, 3½-ton trucks; F. W. D.

Type 5—5-ton trucks, or over: Mack, 5½-ton trucks; Mack, Special Engineer.

Type 6—Motorcycles: Harley-Davidson.

Type 7—Ambulances: G. M. C.

Type 8—Trailers, cargo: Trailers, ¾-ton, tank, water, 180 gallons; trailers, ¾-ton, ration and spare parts; trailer, 1½-ton, 2-wheel, light aviation; trailers, 1½-ton, 4-wheel, cargo; trailers, 1½-ton, 4-wheel, special bodies; trailers, 3-ton, gun and caisson; trailers, 4-ton, 4-wheel, cargo; trailers, 4-ton, 4-wheel, special bodies; trailers, 5-ton, tire press; trailers, 10-ton, portable crane; trailers, 10-ton, tank corps with ramp.

Type 9—Trailers, kitchen: Trailers, 1½-ton, 2-wheel, kitchen, A and B type.

Type 10—Trailers, machine shop: Trailers, 4-ton, 4-wheel, machine shop, spare parts.

Bicycles—Westfield.

SEAPLANE ROUTE OPENED

NEW YORK, Aug. 5—The Travelers Co., Inc., has inaugurated trips by air from this city to Atlantic City, employing a seaplane of Aero Marine make which carries two passengers.

CURTISS SPEEDS PRODUCTION

BUFFALO, N. Y., Aug. 4—The local plant of the Curtiss Aeroplane & Motor Corp. is arranging for the construction of 225 airplanes and 200 motors, according to announcement.

MOLINE IRON WORKS

MOLINE, ILL., Aug. 5—The H. W. Cooper Saddlery Hardware Mfg. Co. has changed its name to the Moline Iron Works. The company has added a line of automobile accessories to its regular lines of saddlery, hardware and malleable

iron castings. New factory buildings are being erected which will double present output.

C. J. & N. W. Cooper, the original founders of the business in 1879, are retiring from active work, but retain a large interest in the concern.

The following officers have been elected for the coming year: President, L. E. Nutt; vice-president, J. J. Creedon; treasurer, J. T. Miles, and secretary, L. H. Dorman.

Pneumatic Tool Statement

NEW YORK, Aug. 6—The semi-annual statement of the Chicago Pneumatic Tool Co. for the period ending June 30 shows a surplus after taxes and charges of \$299,190, an earning of \$4.60 a share on \$6,448,800 capital stock. The statement shows:

| | |
|-----------------------------|-------------|
| Manufacturing profits | \$1,819,226 |
| Expenses | 976,314 |

| | |
|--------------------|-----------|
| Balance | \$842,912 |
| Other income | 10,283 |

| | |
|---|-----------|
| Total income | \$853,195 |
| Interest and taxes | 284,853 |
| Depreciation, renewals and sinking fund | 269,152 |

| | |
|---------------|-----------|
| Surplus | \$299,190 |
|---------------|-----------|

ANNOUNCE NEW FOUNDRY

MILWAUKEE, Aug. 2—The Helgerson Foundry Co. of Green Bay, Wis., has been incorporated with an authorized capital stock of \$100,000 to engage in the manufacture of steel, semi-steel and gray iron castings, specializing in automotive parts. It is the development of the Helgerson gray iron foundry at Green Bay, which will move into a new plant to be equipped with steel furnaces in addition to cupolas.

MILWAUKEE CO. BUILDS

MILWAUKEE, WIS., Aug. 1—The Milwaukee Stamping Co. has broken ground for a three-story manufacturing addition, 80 x 140 ft., which will increase the capacity of its main works at Sixty-fourth and Pullen Avenues, in West Allis, about 75 per cent. The additional facilities will be available about Oct. 1.

INCREASE AUTO CO. STOCK

PHILADELPHIA, PA., Aug. 2—Stockholders of the Auto Car Co. have approved an increase in capital stock from \$2,000,000 to \$10,000,000. The present shareholders will be given an opportunity of subscribing to the new issue up to 50 per cent of their present holdings. Rumors that the company would enter a consolidation have been denied.

NEW STOCK FOR MINNEAPOLIS

NEW YORK, Aug. 2—A new issue of 7 per cent cumulative preferred stock totalling \$2,000,000 has been announced here for the Minneapolis Steel & Machinery Co., of Minneapolis. This stock is now being offered for sale.

Ford Developing The Foreign Field

Copenhagen and Cadiz Assembly Plants to Be in Operation Soon

NEW YORK, Aug. 6—The Ford Motor Co., planning an extensive foreign business with the resumption of normal commerce conditions following the war, has work well under way for location of assembling plants at Copenhagen, Denmark, and Cadiz, Spain.

Machinery already is on the ground for the Copenhagen plant, which will have an initial capacity of twenty-five cars a day, and 700 "knocked down" machines are en route for the commencement of active operations. J. J. Harrington, former Ford manager in Boston, sailed recently to assume charge in the Danish capital.

Equipment for the Cadiz plant is on the way, and the Ford export officials will announce shortly the manager of operations in Spain, where the capacity will be twenty-five cars a day.

It was stated at Ford headquarters here to-day that development of the foreign field was being pushed with vigor, and that demands for cars from all parts of the world were giving the movement a steady impetus.

The British Ford interests are being rapidly reorganized after the war period under the direction of W. C. Anderson, former St. Louis manager, with Sir Percival Perry, former British director, in charge of Fordson tractor production in the United Kingdom.

WORK ON FORD PLANT

NEWARK, N. J., Aug. 6—Work on the Ford Motor Car Co.'s plant on the meadows at Kearny, which is intended to serve as an assembling point with a capacity of 750 cars a day, is being hurried forward, and it is expected that 2500 artisans will be employed by mid-autumn. The Ford company hopes to bring about construction of a branch to the plant of the Hudson tunnel line from New York to Newark.

AUTOCAR INCREASES CAPITAL

ARDMORE, PA., Aug. 6—The Autocar Co. of Ardmore, Pa., at a special meeting of the directors held last month, voted to increase the capital stock from \$2,000,000 to \$10,000,000. Immediate sale of \$1,000,000 of this new issue of capital stock to stockholders of record July 22 was authorized. This company markets its motor truck through factory branches owned and operated by the parent company.

RACE DATES CHANGED

NEW YORK, Aug. 6—The A. A. A. Contest Board announced to-day a change in the date of the 300-mile race at Cincinnati from Oct. 1 to 11, and a definite scheduling of the next meet at Sheepshead Bay for Sept. 20.

NC-4 May Make Flight to Pacific

WASHINGTON, Aug. 2—The naval seaplane NC-4, the first aircraft to cross the Atlantic ocean, may attempt a flight to the Pacific coast, according to announcement made to-day by Senator Phelan of California after a conference with Secretary Daniels.

Present plans are to have the NC-4 make a flight across the continent, stopping at many of the large centers. Early in September the NC-4 will start from Portland for a cruise to Galveston, Tex., and will be under command of Lieut. Commander A. C. Read, who directed its flight across the Atlantic.

PROPOSE NEW AIR ROUTE

WASHINGTON, Aug. 4—This city will have a regular airplane passenger and delivery service between this city and New York if a plan suggested in a letter received to-day by the Washington Chamber of Commerce from the National Air Service Co. is followed. The company has inaugurated such a service between New York and Boston and urges upon the local Chamber of Commerce the selection and acquirement of a landing field in or near the city for passenger airplanes. It is probable Bolling Field will be suggested as the local landing site.

SALE OF SEAPLANES

WASHINGTON, Aug. 4—Secretary Daniels has authorized the sale of 265 seaplanes at public auction to the highest bidders. High-speed machines of large carrying capacity, well adapted to commercial use, will be included in the sale, along with faster and smaller machines. The Department will issue complete details later.

Army Scrap Rubber Stored in Paris



The heap now reaches to the windows of the second floor of adjoining buildings

Seaplanes are already being operated commercially between New York and Atlantic City, San Pedro and Santa Catalina, Key West and Habana and Chicago and Milwaukee, and the projected sale is expected to provide machines for similar ventures. The planes are in good condition, but must be sold because the Navy has insufficient personnel to keep them in proper condition and because of an over supply.

NEW RECORD FOR ALTITUDE

WASHINGTON, Aug. 4—Major R. W. Schroeder, army aviator, yesterday set a new world's speed record for high altitudes, it is claimed, when he flew at a rate of 137 m.p.h. at a height of 18,400 ft. He used a two-seated Lepere airplane, designed by Capt. Lepere of the French Army. It was equipped with a 12-cylinder Liberty motor and a supercharger.

U. S. TO OWN AIR FIELDS

WASHINGTON, Aug. 2—Government ownership of flying fields in this country was urged by Representative La Guardia of New York, formerly a major in the Air Service with the Italian Army, testifying to-day before the special House committee investigating aircraft expenditures. Mr. La Guardia said that most of the fields now used are leased and prepared by the government at great expense.

NEW AIRCRAFT CONCERN

NEW YORK, Aug. 2—With a capitalization of \$5,000,000, the International Air Lines Corp. has been incorporated in Delaware for the purpose of manufacturing airplanes. P. B. Drew, C. L. Rimlinger and H. E. Knox are the incorporators.

Automotive Exports Reach Height in 1916

Greatest Increase in Trade with Latin America—European Business Declines

WASHINGTON, Aug. 4—From 1912 to 1918 the value of automotive exports from the United States rose from \$25,657,294 to \$110,138,831, according to a report from the Bureau of Foreign and Domestic Commerce. Exports during that period to Latin America increased 708 per cent—the value of similar exports to Europe in 1916 was ten times that of the shipments in 1912.

The highest point was reached in 1916 when shipments were worth over \$120,000,000, and consisted principally of motor trucks for war uses. Notwithstanding the restrictions imposed by the United States government during the war, exports during the fiscal year 1917 amounted to \$118,377,047, in 1918 to \$110,138,831, and during the first nine months of the 1919 fiscal year, to \$75,800,000.

While European trade has declined since 1916, exports to Africa have increased 9 per cent; shipments to Asia and Oceania rose 21 per cent in 1917, but fell 26 per cent in 1918. Trade with Canada and other sections north of the United States increased 43 per cent in 1917 and 11 per cent in 1918. Exports to Canada in 1918 amounted to \$23,600,000, or nearly as much as the value of shipments to all Latin America. Exports of cars to Latin America increased 252 per cent in 1916, 101 per cent in 1917 and 47 per cent in 1918. The jump in 1916 succeeded the general depression that followed the outbreak of the war.

In 1912 motor cars and trucks sent to Latin America constituted 11 per cent of all exports of this class. In 1913 the value of the shipments rose to 14 per cent of the total, but fell to 10 per cent the next year, and reached the lowest mark, 3.5 per cent, in 1915. In 1916, though exports to these countries were worth almost twice as much as in 1913, they constituted only 6.8 per cent of the whole, in 1917 they grew to 14 per cent and in 1918 to 22 per cent.

RETROACTIVE TAXATION RULING

NEW YORK, Aug. 4—Taxation on cars and trucks, as well as parts and accessories, sold to any of the States or political sub-divisions is a new ruling of the Internal Revenue Department outlined in General Bulletin No. 332, just issued by the Automobile Chamber of Commerce. The new ruling was announced on July 30 and, according to the bulletin, came entirely without warning. Trucks and cars are taxed back to Oct. 3, 1917, while tires, inner tubes, parts and accessories are taxed from Feb. 25, 1918. Members of the organization are asked to use their efforts to have the retroactive section of the ruling overthrown.

Calendar

SHOWS

- Sept. 13-20—Cincinnati, O. Ninth Annual Music Hall. Cincinnati Automobile Dealers' Assn., H. K. Shockley, Manager.
- Sept. 15-20—Springfield, Mass. Eastern States Exposition.
- Oct. 6-11—Detroit, Mich. Closed Car Show, Arena Gardens. Detroit Auto Dealers' Assn., H. H. Stuart, Mgr.
- *Oct. 9-19—Paris. Grand Palais, International Automobile Mfrs. Congress.
- Nov. 3-8—Chicago, Ill. Business Exhibit of Automotive equipment Assn., Medinah Temple.
- Nov. 7-16—London. Olympia Motor Car Exhibition—Society of Motor Mfrs. and Trades.
- December—Brussels. International Automobile Mfrs. Congress.
- January—New York. International Automobile Mfrs. Congress.
- Jan. 3-10—New York, N. Y. Grand Central Palace. National Automobile Chamber of Commerce, S. A. Miles, Manager.
- Jan. 24-31—Chicago, Ill. Coliseum, Cars, Drexel Pavilion, Trucks, National Automobile Chamber of Commerce, S. A. Miles, Manager.
- February—Chicago. International Automobile Mfrs. Congress.
- Feb. 23-March 6—Birmingham, Eng. British Industries Fair.

AUTOMOTIVE SHOWS AT FAIRS

- Aug. 9-16—Sedalia, Mo. Tractors, Missouri State Fair. Kansas City Tractor Club.
- Aug. 20-29—Des Moines, Ia. Machinery Hall.
- Aug. 26-29—Madison, Wis. Cars, trucks and tractors, accessories, Dane County Fair, Madison Assn. of Commerce.
- Aug. 26-29—Columbus, O. Cars and tractors. E. V. Walborn, Manager.
- Aug. 30-Sept. 6—Minnesota State Fair.

- Aug. 31-Sept. 5—Lincoln, Neb. Cars, trucks and tractors. E. R. Danielson, Supt. of Concessions.
- Sept. 1-5—Hartford, Conn. Connecticut Fair Assn.
- Sept. 1-5—Wheeling, W. Va. Cars, trucks and tractors.
- Sept. 1-6—Indianapolis, Ind. State Fair. Cars and Accessories, Indianapolis Automobile Trade Assn., John B. Orman, Manager.
- Sept. 1-6—Rochester, N. Y. Automobile Club of Rochester. E. F. Edwards, Manager.
- Sept. 1-6—Spokane, Wash. Cars, trucks and tractors.
- Sept. 8-13—Helena, Mont. Cars, trucks and tractors.
- Sept. 8-13—Milwaukee, Wis. Milwaukee Automobile Dealers, Inc., Bart J. Ruddle, Manager.
- Sept. 8-13—Syracuse, N. Y. Cars, trucks and tractors.
- Sept. 8-13—Topeka, Kan. Cars, trucks and tractors, Motor Hall and Machinery Field.
- Sept. 9-13—Douglas, Wyo. Cars, trucks and tractors.
- Sept. 12-20—Peoria, Ill. Cars, trucks and tractors.
- Sept. 13-20—Hutchinson, Kan. Cars, trucks and tractors.
- Sept. 14-20—Sioux City, Ia. Cars, trucks and tractors.
- Sept. 15-20—Springfield, Mass. Cars, trucks and tractors. O. A. Nash, Asst. Gen. Manager.
- Sept. 15-20—Yakima, Wash. Cars, trucks and tractors.
- Sept. 16-19—Billings, Mont. Cars, trucks and tractors.
- Sept. 20-27—Oklahoma City, Okla. Cars, trucks and tractors. J. S. Malone, General Manager.
- Sept. 20-27—Memphis, Tenn. Cars, trucks and tractors.
- Sept. 22-27—Allentown, Pa. Lehigh County Agricultural Assn.
- Sept. 22-27—Pueblo, Col. Cars, trucks and tractors. J. L. Beaman, Manager.
- Sept. 22-27—Salem, Ore. Cars, trucks and tractors. Dealers' Motor Car Assn., M. O. Wilkins, Manager.
- Sept. 24-Oct. 4—Kansas City, Kan. Cars, trucks and tractors.
- Sept. 29-Oct. 4—Meridian, Miss. Cars and tractors. A. H. George, General Manager.

- Sept. 29-Oct. 4—Chattanooga, Tenn. Chattanooga Auto Dealers' Assn.
- Sept. 29-Oct. 4—Muskogee, Okla. Cars, trucks and tractors.
- Sept. 30-Oct. 3—Brockton, Mass. Cars.
- Sept. 30-Oct. 4—Lancaster, Pa. Lancaster Fair Assn.
- October—Columbia, S. C. Columbia Automobile Dealers' Assn.
- Oct. 20-25—Raleigh, N. C. Cars, trucks and tractors.
- Oct. 22-27—Shreveport, La. Cars, trucks and tractors.

TRACTOR SHOWS

- August—Harrisburg. Cars, tractors, trucks, automotive equipment. J. Clyde Myton, Mgr.
- Aug. 6-7—Fostoria, O. In charge of Prof. H. C. Ramsower, head of Agricultural Engineering Dept. of Ohio State University.
- Aug. 12-13—Akron, O. In charge of Prof. H. C. Ramsower, head of Agricultural Engineering Dept. of Ohio State University.
- Aug. 19-21—Aberdeen, S. D. Tractors, Tractor Accessories and Farm Lighting Plants. Aberdeen Commercial Club.
- Aug. 19-22—Toledo, O. Lucas County Fair. H. B. Marks, Mgr.
- Aug. 26-28—Rockford, Ill. County Fair.
- Aug. 26-30—Wausaw, Pa. Marathon County Fair.
- Sept. 1-6—Greenville, S. C. Agricultural Implements and Tractors. F. M. Burnett, General Manager.
- Sept. 8-13—Huron, S. D. Cars, tractors, trucks, automotive equipment. C. N. McIlvane, Mgr.
- September—Los Angeles, Cal. Regional Tractor Demonstration under the auspices of the National Implement & Vehicle Assn.
- Sept. 9-12—Streator, Ill. Northern Illinois Tractor & Truck Assn.
- Sept. 15-20—Allentown, Pa. Lehigh County Agricultural Assn.

- Sept. 22-28—Waterloo, Ia. Automobile show, in connection with Waterloo Dairy Cattle Congress; Black Hawk County Motor Trades Bureau, G. V. Orr, Secretary.
- Oct. 14-16—Ottawa, Ont., Can. Interprovincial Plowing Match and Tractor Demonstration.
- Nov. 22-29—Jacksonville, Fla. Florida State Fair and Exposition. B. K. Hanafourde, Mgr.
- February—Kansas City, Mo. Fifth Annual Kansas City Tractor Club, Guy H. Hall, Manager.

CONTESTS

- *Aug. 15—Middletown, N. Y. Dirt track event.
- *Aug. 22-23—Elgin, Ill. 308 Mile road race.
- Sept. 1—Uniontown, Pa. Speedway race.
- Sept. 20—Sheepshead Bay, L. I. Speedway race.
- *Sept. 27—Allentown, Pa. Dirt track event.
- Oct. 11—Cincinnati, O. Speedway race.
- *Oct. 4—Trenton, N. J. Dirt track event.
- *Oct. 11—Danbury, Conn. Dirt track event.

*Tentative dates.

CONVENTIONS

- Sept. 22-24—Philadelphia. Annual Convention, National Association of Purchasing Agents. Bellevue-Stratford.
- Oct. 14-17—Atlantic City, N. J. Twenty-fifth Annual Convention, Marlborough-Blenheim, National Hardware Association of the United States.
- Oct. 1—Denver, Col. Directors' Meeting, National Automobile Dealers' Assn.
- Nov. 3-8—Chicago, Ill. Convention, Automotive Equipment Assn., Medinah Temple.
- January, 1920—Washington. Pan-American conference.
- May 12-15, 1920—San Francisco. Seventh International Foreign Trade Convention.

EXPORT OPENINGS IN FOREIGN LANDS

WASHINGTON, Aug. 4—The Bureau of Foreign and Domestic Commerce, Department of Commerce, has received requests for automobiles or parts agencies of business from individuals and companies in foreign countries. These are listed below. For further information address the Bureau of Foreign and Domestic Commerce and specify the Foreign Trade Opportunity number.

Spain—Automobile lighting generators, starting motors and magnetos. Correspondence may be in English. Reference. 30071.

Gibraltar—Cars, trucks, and gasoline. References. 30072.

Finland—Gasoline and electric motors. Reference. 30100.

American firm establishing agencies in Argentina, Paraguay, Uruguay and Brazil for sale of automobiles and accessories. Reference. 30094.

Agent in Cuba, Panama, Colombia, Ecuador, Peru, Chile, Argentina, Brazil, Bolivia, Uruguay, Paraguay and Vene-

zuela to secure direct representations from manufacturers and exporters for the sale of tractors. 30083.

Argentina—Machinery in general, automobiles and trucks. Correspondence should be in Spanish. References. 30057.

Belgium—Trucks with a capacity of 2 and 3 tons. Quotations should be given c.i.f. Antwerp. Payment, cash. Correspondence may be in English. References. 30062.

Switzerland—Stationary motors and engines driven by gasoline, kerosene and electricity (horizontal 20 to 120 hp.). Correspondence may be in English. References. 30060.

Italian company wishes to form a combination with an American concern manufacturing controllers, steel wheels, and entire electrical truck minus the batteries. Correspondence should be in French or Italian. 30043.

Spain—Asbestos packing, piston rings, drills, files, magnetos, copper connections, wheels, automobiles, tools, parts, tires and accessories. Quotations should

be given f.o.b. American port. Terms, cash against documents at destination. Correspondence may be in English. No. 29879.

MAY RETIRE GOODS IN CHILE

WASHINGTON, Aug. 1—The Consulate at Antofagasta, Chile, wishes to place its service at the disposal of American exporters whose goods for various reasons have not been retired in the customary manner from the custom house at Antofagasta, according to a report from the Chilean American consul. It is suggested that shippers who are facing a loss may desire that the consul appoint a proper agent to take charge of the merchandise affected and dispose of it in the best possible manner under the supervision of the American consul. Interested exporters are invited to communicate with the district offices of the Bureau of Foreign and Domestic Commerce or with the office of the Bureau in Washington, recording their interest in entering into such an arrangement.